

growing nearby[160, 200]. An excellent companion plant, when grown in orchards it can increase yields from the fruit trees by up to 10%.

4.1.4 *Elaeagnus umbellata*

Autumn Olive
tfo2n 3 tlin 7 cyuc 4 kcaak 3 tcan 2 dwat 4.5 m hkuc
htut cyutli hqatkyuctcup hwicli hyishrasjlutnyik hpa7tli flat-prikklwis hpa7tmwatli xre7t hjonli

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

pista *E. umbellata* has the potential of becoming one of the most troublesome adventive shrubs in the central and eastern United States.

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

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

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

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

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

nwatta Agroforestry Services: Nitrogen Agroforestry Services: Windbreak Fodder: Bank Industrial Crop: Biomass Management: Coppice Management: Standard Minor Global Crop Succeeds in most soils that are well-drained[11, 200], though it dislikes shallow chalk soils[98]. It prefers a soil that is only moderately fertile, succeeding in very poor soils and in dry soils[11, 200]. Prefers a light

sandy loam and a sunny position[11]. Established plants are very drought resistant[1]. A very hardy plant, tolerating temperatures down to at least -40°C[200]. This species is somewhat similar to *E. multiflora*, but it flowers a few weeks later[182]. Sometimes cultivated for its edible fruit, there are some named varieties[183]. 'Cardinal' and 'Red Wing' are very good fruiting forms (developed for ornament and not for fruit quality)[182]. 'Jazbo' has been bred for its edible fruits which are said to be ripe when 'they drop into your hand'[214]. This makes them valuable in breeding programmes to develop easily harvested fruits[214]. Flowers are rich in nectar and very aromatic, they are much visited by bees. Polymorphic[11, 275]. This species is notably resistant to honey fungus[88, 200]. Plants can fruit in 6 years from seed[160]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[160, 200]. An excellent companion plant, when grown in orchards it can increase yields from the fruit trees by up to 10%. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

4.1.5 *Hedysarum boreale*

Sweet Vetch, Utah sweetvetch, Northern sweetvetch
tfo2n 3 tlin 7 cyuc 4 kcaak 3 tcan 0 dwat 0.1 m hkuc
htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikklwis hpa7tmwatli xre7t hjonli

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

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

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

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

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

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

4.1.6 *Hedysarum boreale mackenzii*

Liquorice Root
tfo2n 3 tlin 7 cyuc 4 kcaak 0 tcan 0 dwat m hkuc
htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikklwis hpa7tmwatli xre7t hjonli

A, C and E, flavanoids and other bio-active compounds. It is also a fairly good source of essential fatty acids, which is fairly unusual for a fruit. It is being investigated as a food that is capable of reducing the incidence of cancer and also as a means of halting or reversing the growth of cancers[214]. The juice is also a component of many vitamin-rich medicaments and cosmetic preparations such as face-creams and toothpastes[9]. A decoction of the fruit has been used as a wash to treat skin irritation and eruptions[254].

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

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

nwatta Agroforestry Services: Alley crop Agroforestry Services: Nitrogen Agroforestry Services: Wind-break Fodder: Bank Industrial Crop: Biomass Management: Coppice Management: Standard Other Systems: Strip intercrop Staple Crop: OilLandscape Uses:Border, Seashore, Specimen. Succeeds in most soils[200], including poor ones[186], so long as they are not too dry[182, 200]. Grows well by water and in fairly wet soils[182]. Established plants are very drought resistant[186]. Requires a sunny position[3], seedlings failing to grow in a shady position and mature shrubs quickly dying if overshadowed by taller plants[186]. Does well in very sandy soils[1, 186]. Very tolerant of maritime exposure[75]. Plants are fairly slow growing[75]. Although usually found near the coast in the wild, they thrive when grown inland[11] and are hardy to about -25°C[184]. A very ornamental plant[1, 11], it is occasionally cultivated, especially in N. Europe, for its edible fruit, there are some named varieties[183]. 'Leikora' is a free-fruited form, developed for its ornamental value. Members of this genus are attracting considerable interest from breeding institutes for their nutrient-rich fruits that can promote the general health of the body (see edible and medicinal uses below)[214]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[113, 186, 200]. Plants produce abundant suckers, especially when grown on sandy soils[186]. Dioecious. Male and female plants must be grown if seed is required. The sexes of plants cannot be distinguished before flowering, but on flowering plants the buds of male plants in winter are conical and conspicuous whilst female buds are smaller and rounded[11]. Plants in this genus are notably resistant to honey fungus[200].Special Features:Not North American native, Naturalizing, Inconspicuous flowers or blooms. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern

is also useful and given here if available. A clumping plant, forming a colony from shoots away from the crown but with a limited spread [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is suckering with new plants from underground runners away from the plant [2-1].

4.1.3 *Elaeagnus parvifolia*

Autumn olive
tfo2n 3 tlin 7 cyuc 4 kcaak 2 tcan 2 dwat 4.5 m hkuc
htut cyutli hgatkyuctcup hwicli hyishrasljutnyik hpa7tli flat-
priklwis hpa7tmwatli xre7t hjonli

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

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

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

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

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

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

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

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

tcanta Fuel Pioneer Soil stabilization WoodThe plant is very fast growing, even in areas exposed to maritime winds, and it makes an excellent pioneer species for providing shelter and helping to establish woodland conditions. The plant is very light-demanding and so will eventually be shaded out by the woodland trees, thus it will never out-stay its welcome[K]. The trees have an extensive and vigorous root system and sucker freely once established. They are thus excellent for stabilising the soil, especially on slopes, and are often planted in the Himalayas to prevent land slips on the mountain slopes and create conditions for the re-establishment of woodlands[K]. The wood is very tough and hard - it can be used for many purposes including wheel hubs and other applications where toughness is essential[K]. It is also used for fuel[146].

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

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

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

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

spheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. Dioecious. Male and female plants must be grown if seed is required.

4.1.2 Hippophae rhamnoides

Sea Buckthorn, Seaberry
tfo2n 3 tlin 7 cyuc 5 kcaak 5 tcan 5 dwat 6 m hkuic
htut cyutli hgatyuctcuphja7n hwicli hyhshrasjnutnyk hpa7li flatprikwis hpa7tmwatli nyanhjen hjonli

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

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

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

tcanta Charcoal Cosmetic Dye Fodder Fuel Oil Pioneer Soil stabilization WoodVery tolerant of maritime exposure[29, 49, 75, 182], it can be used as a shelter hedge. It dislikes much trimming[75]. A very thorny plant, it quickly makes an impenetrable barrier. Sea buckthorn has an extensive root system and suckers vigorously and so has been used in soil conservation schemes, especially on sandy soils. The fibrous and suckering root system acts to bind the sand[186, 244]. Because the plant grows quickly, even in very exposed conditions, and also adds nitrogen to the soil, it can be used as a pioneer species to help the re-establishment of woodland in difficult areas. Because the plant is very light-demanding it will eventually be out-competed by the woodland trees and so will not out-stay its welcome[K]. The seeds contain 12 - 13% of a slow-drying oil[240]. The vitamin-rich fruit juice is used cosmetically in face-masks etc[9]. A yellow dye is obtained from the fruit[74]. A yellow dye is obtained from the stems, root and foliage[4]. A blackish-brown dye is obtained from the young leaves and shoots[74]. Wood - tough, hard, very durable, fine-grained. Used for fine carpentry, turning etc[46, 61, 74]. The wood is also used for fuel and charcoal[146].

dwatta Astringent Cancer Cardiac Eczema Poulitice Tonic Vermifuge Vitamin CThe twigs and leaves contain 4 - 5% tannin[240]. They are astringent and vermifuge[7, 100]. The tender branches and leaves contain bio-active substances which are used to produce an oil that is quite distinct from the oil produced from the fruit. Yields of around 3% of oil are obtained[240]. This oil is used as an ointment for treating burns[214]. A high-quality medicinal oil is made from the fruit and used in the treatment of cardiac disorders, it is also said to be particularly effective when applied to the skin to heal burns, eczema and radiation injury, and is taken internally in the treatment of stomach and intestinal diseases[214]. The fruit is astringent and used as a tonic[9, 254]. The freshly-pressed juice is used in the treatment of colds, febrile conditions, exhaustion etc[9]. The fruit is a very rich source of vitamins and minerals, especially in vitamins

Plants For a Future 2021CE Hardiness Zone 6, Wet, Heavy Loam

pfaf.org

2021

Contents

1 Introduction	3
1.1 Pronunciation guide	3
1.2 vocabulary	3
2 1 tlin	4
2.1 bwon	4
2.2 mran	4
3 2 tlin	5
3.1 bwon	5
3.2 mran	11
4 3 tlin	29
4.1 bwon	29
4.2 mran	39
5 4 tlin	178
5.1 bwon	178
5.2 mran	195
6 5 tlin	521
6.1 bwon	521
6.2 mran	535
7 Alphabetical Index	751

1 Introduction

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

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

Instructions for food forest design are in separate books. But basic idea is to have thorny plants on the border as a form of fence to keep out predators and animals that want to raid your food forest, with the shortest plants closest to the border, then gradually getting taller plants as you go in. For example starting with thorny herbaceous, then row of thorny shrub, the row of thorny trees. Afterwards can put in several rows of your staple crop, which typically is a variety of nut, acorn and bean producing tall trees. Then can put in a long rotation coppice of hardwood lumber trees you find useful, then a row or more of fruit trees, then a short rotation coppice to use for firewood, then some rows of berry, bean and nut shrubs, with the closest circle near the community being vegetables and perennials that take more care than the others.

You need about a hectare of land (2.5 acres) per person if you have 6 months growing season (where average temperature is above 10C), at least half of of which should be dedicated to food, the other half can be to lumber, but can also be food trees that are occasionally used as lumber. A general formula is 6/monthsGrowingSeason to see how many hectares you need. This assumes you have at least 600mm of rainfall per year, and only works if you have more than 3

months growing season, as very little you can grow in less than that.

If you live in a dry area, especially one prone to flash floods, then it is imperative that you spend you dry season digging swales and vernal pools, that will collect the rain water during the flash floods and keep it in place so that it enters the ground, then you can grow things downhill of your vernal pools and swales. It is generally more important that they be extensive than deep. You want to ideally catch every drop, so that none of it leaves your property.

By contrast if you live in a very wet area with more than enough water, then you want to have ditches to help the water leave the property and not waterlog your soil.

If you have a slope exceeding 30 degrees then you will want to reinforce with terraces any water catchment areas such as vernal pools or ponds, also can use terraces for growing tubers or anything that requires digging to plant or harvest, otherwise your soil is liable to wash away. You may wish to use terraces with smaller slopes as well if you are doing soil tilling or digging. In a food forest permaculture system generally you want to minimize soil disturbance and focus on getting your food from fruits, leaves, bark or other above ground sources.

In a medium wetness area you can use either method to create various microclimates for different kinds of plants.

In either case you want to start with about 1 in three plants being a nitrogen fixer (bwon), as it will help your food forest grow faster.

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

1.1 Pronunciation guide

a /a/, b /b/, c /j/ "sh", d /d/, e /e/, f /f/, g /g/, h /h/, i /i/, j /j/ "zh", k /k/, l /l/, m /m/, n /n/, o /o/, p /p/, q /q/ "ng", r /r/, s /s/, t /t/, u /u/, v /v/, w /w/, x /x/ /g/ "gh", y /y/, z /z/, 2 /1/ (low tone), 6 /a/ "uh", 7 /1/ (high tone).

1.2 vocabulary

tlin /tlin/ cold hardiness, cyuc /tju/ heat hardiness, kcaak /kjak/ food (rating), tcan /tjan/ other (uses rating), dwat /dwat/ medicinal (rating), hkuc /hku/ (adult) height, hsi2n /hsi:n/ (adult) width, ksan /ksan/ least (minimum).

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

hgat /hga/ drought (tolerant), kyuc /kju/ dry, tcup /tjup/ damp, hja7n /hja:n/ wet, hs6s /hs6s/ puddle, hwic /hwi/ water (requirement).

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

frus /frus/ corrosive (very acid), flat /flat/ acid, prik /prik/ passive (neutral), lwis /lwis/ alkaline, slip /slip/ slippery (very alkaline), hsom /hsom/ salt (saline), hpa7tmwat /hpa7tmwat/ topsoil taste.

fyif /fjif/ self (fertile), xre7t /yre7t/, nyanhjen /njanh3en/ male-female (dioecious, distinct male and female plants), hjon /hjon/ sex.

hmuc /hmuf/ purpose, pcis /pjis/ danger, trot /trot/ temperature, wrop /wrop/ fertile, tcan /tjan/ other, hyum /hjum/ uses, dwat /dwat/ medicine, drut /drut/ description,

kceec /kʃeʃ/ region, tfo2n /tfoɪn/ nitrogen-fixing, xlutkfam /ʃlut.kfam/ plant quantity, bwon /bwɔn/ bean, mran /mran/ corn/grain non-nitrogen-fixing plant, nrak /nrak/ continent (of origin), ksac /ksaʃ/ circumstances/habitat.

5 hmucrotrokceec, tcup hmuchwic, 0 ksankcak, nyik hmuchpa7t, lwis hmuchpa7tmwat, 1757 xlutkfam.

2 1 tlin

2.1 bwon

2.1.1 Phaseolus coccineus

Runner Bean, Scarlet runner

tfo2n 1 tlin 12 cyuc 4 kcak 3 tcان 0 dwat 3 m hkuc htut cyutli tcup hwicli hrasjutnyik hpa7tli priklwis hpa7tmwatli fyfxire7t hjonli

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

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

kcakta Edible Parts: Flowers Leaves Root Seed Seed-podEdible Uses: Immature seedpods - raw or cooked[1, 2, 37, 46]. They have a pleasant mild flavour and are widely used as a vegetable in many areas of the world. They can be added to salads, cooked as a vegetable or added to soups, stews etc[183]. The immature seed is used like shelled beans as a vegetable[183]. The protein-rich mature seeds can be dried and stored for future use. They need to be thoroughly cooked before being eaten in order to destroy a toxic principle. They are soaked for 12 hours prior to use and are eaten boiled or added to soups etc. The seed can also be ground into a powder and added to cereal flours for making protein-enriched bread etc[183]. Flowers - raw. A bean-like taste[177, 183]. Young leaves - cooked and used as a potherb[183]. Root - cooked. Rich in starch[183]. Another report says that the root is poisonous[2]. Carbon Farming - Staple Crop: protein.

tcanta Nitrogen. Carbon Farming - Agroforestry Services: nitrogen. Attracts hummingbirds.

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

nwatta Agroforestry Services: Nitrogen Management: Standard Minor Global Crop Staple Crop: ProteinAs an annual suites hardiness zones 1-12. Heat zone: 12-1. As a perennial hardiness zones 10-12. Requires a warm sheltered sunny position in a rich well-drained soil with plenty of moisture in the growing season[1, 16, 37, 200]. Dislikes heavy, wet or acid soils[16]. Prefers a pH in the range 6 to 7[200]. The runner bean is commonly cultivated in many parts of the world for its edible seeds and immature seedpods, there are many named varieties[183]. Most varieties are climbing plants but some dwarf forms have been developed[200]. Plants are perennials but are often grown as annuals, especially in the temperate zone. Plants flower under long day conditions, which is ideal for temperate regions[200]. When grown for their edible pods, the immature pods should be harvested regularly in order to promote extra flower production and therefore higher yields[200]. The perennial roots will survive mild winters outdoors in many parts of the country, especially if given a protective mulch in late autumn, they will then give an earlier but lighter crop the following year. They can also be dug up in late autumn and stored

like dahlias in a cool but frost free place over winter and re-planted in the following spring. The plants might need some protection from slugs since these creatures adore the young shoots in the spring[K]. Runner beans grow well with carrots, cauliflowers, cucumbers, cabbage, leek and celeriac[18, 20]. They are inhibited by alliums and fennel growing nearby[18, 20]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. Carbon Farming - Cultivation: regional crop. Management: standard. Phaseolus coccineus ssp.polyanthus (Cache Bean) is also worth considering as a carbon farming plant. It is similar to Phaseolus coccineus but more suited to tropical highlands and semi-arid conditions.

2.2 mran

2.2.1 Geum triflorum

Purple Avens, Old man’s whiskers, Prairie Smoke

1 tlin 5 cyuc 2 kcak 0 tcان 2 dwat 0.3 m hkuc hminhtut cyutli tcup hwicli hrasjutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Geum triflorum is a PERENNIAL growing to 0.3 m (1ft) by 0.3 m (1ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 1. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Edible Uses: TeaA decoction of the roots is a tea substitute[183, 257]. It tastes like a weak sa-safras tea[212]. A brew was used in Indian sweat houses as a body wash for aches and pains[207].

tcanta EssentialThe crushed ripe seeds are used as a perfume[207, 257].

dwatta Ophthalmic Salve TonicA strong decoction of the roots is used as a tonic in the treatment of severe coughs and fevers[207, 257]. This decoction can also be used as an eye wash and as a mouth wash for sore throats[213, 257]. An infusion of the roots, mixed with oil, can be applied as a salve to sores, rashes, blisters and flesh wounds[257]. An infusion can also be used as a wash for aching joints, stiff sore muscles etc[257].

nrakta N. America - Newfoundland and New York, west to British Columbia and south to California. ksacta Damp places and mountain screes[187].

propta Seed - sow spring or autumn in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer Division in spring or autumn. This should be done every 3 - 4 years in order to maintain the vigour of the plant[200]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Landscape Uses:Ground cover. Easily grown in any moderately good garden soil that is well-drained[1]. Prefers a soil rich in organic matter[200]. Prefers a rather damp soil[187]. Plants are hardy to about -20°c[187]. Hybridizes freely with other members of this genus[200]. Special Features:Attractive foliage, North American native, Suitable for cut flowers.

2.2.2 Equisetum scirpoides

Dwarf scouring rush

1 tlin 9 cyuc 2 kcak 3 tcان 2 dwat 0.2 m hkuc pcmhmimhtut cyutli tcuphja7n hwicli hrasjutnyik hpa7tli flatpriklwisslip hpa7tmwatli hjonli

drutta Equisetum scirpoides is an evergreen Perennial growing to 0.2 m (0ft 8in) by 0.2 m (0ft 8in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 2. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow

ripe if this is possible, otherwise in late winter. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division of suckers in the dormant season[188]. Root cuttings in late winter[188].

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

3.2.34 Fraxinus nigra

Black Ash

2 tin 5 cyuc 0 kcak 0 tcان 1 dwat 25 m hkuc htut cyutli tcuphja7n hwicli hrasjutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Fraxinus nigra is a deciduous Tree growing to 25 m (82ft 0in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist or wet soil. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

tcanta Basketry Dye Fuel WoodLogs of wood can be beaten with mauls to separate the growth layers, these layers can then be cut into strips and woven into baskets[257]. A blue dye can be obtained from the bark[257]. Wood - not strong, rather soft, durable, heavy, tough, coarse-grained, easily separated into thin layers. It weighs 39lb per cubic foot. Largely used for making furniture, cabinet making, interior finish and veneer[46, 61, 82, 171, 229, 235]. The wood makes a good fuel, it does not crackle or shoot sparks like many other woods[257]. If the wood is soaked in water and then pounded, it separates easily into thin sheets[226]. These sheets have then been used to make woven baskets, barrel hoops, chair seats etc[226].

dwatta Diaphoretic Diuretic Laxative Ophthalmic Tonic-The leaves are diaphoretic, diuretic, laxative[4]. They should be gathered in June, well dried and stored in airtight containers[4]. The inner bark has been used as a tonic for the liver and stomach, to check vaginal discharge and to treat painful urination[257]. An infusion of the inner bark has been used as an eye wash for sore eyes[257].

nrakta North-eastern N. America - Newfoundland to Manitoba, south to Virginia and Iowa. ksacta Deep cold swamps, river banks and shores, tolerating some standing water[43, 82, 229].

propta The seed is best harvested green - as soon as it is fully developed but before it has fully dried on the tree - and can then be sown immediately in a cold frame[80]. It usually germinates in the spring[80]. Stored seed requires a period of cold stratification and is best sown as soon as possible in a cold frame[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant them out into their permanent positions or a nursery bed in late spring or early summer of the following year. If you have sufficient seed then it is possible to sow it directly into an outdoor seedbed, preferably in the autumn. Grow the seedlings on in the seedbed for 2 years before transplanting either to their permanent positions or to nursery beds.

nwatta Prefers a deep loamy soil, even if it is on the heavy side[1, 200]. Most members of this genus are gross feeders and require a rich soil[11, 200]. A plant of swamps in the wild, in Britain this species requires a moist to

wet soil[200]. It succeeds when growing in exposed positions[200] and also in alkaline soils[11]. Plants are tolerant of atmospheric pollution[200]. A moderate to slow-growing tree in the wild[229], it is not a great success in Britain, where it is often damaged by late frosts[11]. This species is closely related to *F. mandshurica*[200]. Trees can bear hermaphrodite flowers, separate male and female flowers, or flowers of one sex only[229]. Special Features: Not North American native, Inconspicuous flowers or blooms.

3.2.35 Carex eburnea

Bristleleaf sedge
2 tin 8 cyuc 0 kcak 3 tcان 0 dwat 0.3 m hkuc pcmhmim cyutli hgatyuctcup hwicli hyhisrasjutnyik hpa7tli flatpriklwisslip hpa7tmwatli hjonli

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

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

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

propta Propagate by seed, or clump division in early spring. Can be cut back regularly during its growing season.

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

4 3 tlin

4.1 bwon

4.1.1 Hippophae salicifolia

Willow-Leaved Sea Buckthorn
tfo2n 3 tlin 7 cyuc 5 kcak 5 tcان 3 dwat 15 m hkuc htut cyutli kyuctcuphja7n hwicli hyhisrasjutnyik hpa7tli flat-priklwis hpa7tmwatli nyanhjen hjonli

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

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 46]. A very nutritious food, and possibly the most nutritious fruit that can be grown in temperate climates. It

within 12 metres of buildings since the root system can damage the building's foundations by drying out the soil[11]. Dioecious. Male and female plants must be grown if seed is required. Hybridizes freely with other members of this genus[200]. Special Features: North American native, Inconspicuous flowers or blooms.

3.2.31 Tamarix ramosissima

Tamarisk, Saltcedar
2 tlin 9 cyuc 1 kcaak 0 tcan 0 dwat 4.5 m hkuc
htut cyutli kyuctcup hwicli hrasjlutnyikfrp hpa7tli flatprikli-wissiphom hpa7tmwatli xre7t hjonli

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

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

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

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

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

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

3.2.32 Potentilla fruticosa

Shrubby Cinquefoil, Potentilla
2 tlin 6 cyuc 1 kcaak 0 tcan 1 dwat 1.2 m hkuc
hmimhtut cyutli hgattcup hwicli hrasjlutnyik hpa7tli flatprikli-wis hpa7tmwatli nyanhjen hjonli

drutta Potentilla fruticosa is a deciduous Shrub growing to 1.2 m (4ft) by 1.2 m (4ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to July. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Bees, flies. The plant is not self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and

prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: Edible Uses: TeaA tea is made from the dried leaves[2, 46, 61, 183, 257, 272]. Used as a substitute for China tea, especially by people living at high elevations in the Himalayas[272].

tcanta Hedge Hedge Incense Packing Soil stabilization TinderCan be grown as a medium size informal hedge[29, 200]. Trim in spring[200]. Some forms, notably 'Longacre', 'Elizabeth' and 'Gold Drop' have a dense spreading habit and make good ground cover plants[197]. A useful plant for controlling soil erosion[158]. The dry, flaky bark is used as a tinder for friction fires[99, 257]. (fires started by rubbing 2 pieces of wood together very fast). The powdered plant is used as an incense[272]. The leaves are used as a packing material in pillows[257].

dwatta AstringentThe leaves are astringent[240]. The juice of the root is used in the treatment of indigestion[272].

nrakta Europe, including Britain, from Sweden south and east to the Pyrenees, N. and C. Asia to Japan. ksacta Damp rocky ground, usually on limestone[17].

propta Seed - sow early spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 3 - 5cm with a heel, July/August in a frame. Pot up in the autumn if possible and overwinter in a cold frame[78]. Softwood cuttings taken in the early summer[11, 113]. Easy.

nwatta Landscape Uses:Border, Foundation, Ground cover, Massing, Rock garden, Specimen. Easily grown in a well-drained loam, preferring a position in full sun but tolerating shade[1]. Prefers an alkaline soil but tolerates a slightly acid soil[200]. Prefers a light well-drained soil[108]. Established plants are drought tolerant[190]. A very cold-hardy plant, tolerating temperatures down to at least -25°C[184]. A very ornamental shrub[1], there are many named varieties[11]. Polymorphic[11]. A good bee plant[108]. Members of this genus are rarely if ever troubled by browsing deer[233]. Dislikes growing under trees, especially Juglans species[18]. Plants are usually dioecious but hermaphrodite forms are also known[182]. Male and female plants must be grown if seed is required. Special Features: North American native, Attracts butterflies, Attractive flowers or blooms.

3.2.33 Sorbaria sorbifolia

false spiraea
2 tlin 7 cyuc 1 kcaak 0 tcan 0 dwat 1.8 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Sorbaria sorbifolia is a deciduous Shrub growing to 1.8 m (6ft) by 3 m (9ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 2. It is in flower from July to August, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. It can tolerate atmospheric pollution.

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

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

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

propta Seed - we have no information for this species but suggest sowing the seed in a cold frame as soon as it is

in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist or wet soil.

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

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

dwatta We found no specific reference to this species but in general horsetails have an unusual chemistry compared to most other plants; they are rich in silica, more than 35% contain several alkaloids (including nicotine) and various minerals. Horsetail is very astringent and makes an excellent clotting agent, staunching wounds, stopping nosebleeds and reducing the coughing up of blood. It helps speed the repair of damaged connective tissue, improving its strength and elasticity. Horsetail provides a naturally occurring source of organic silica. It is therefore a remedy for conditions where there is an inability to absorb and retain silica. When this occurs there are weaknesses in the hard structures of the body. The hair becomes thin, fails to thrive, and fizzles away into split ends. The nails are often weak, breaking easily, with hangnails and lingering infections about the nail. In homeopathy, silica is known as the "homeopathic scalpel," because of its ability to act like a blade, like flint, to cut, to bring matters to the surface and to heal charitably. It cuts in, opens tissues, and releases pus and corrupted material, while cleansing and reincarnating flesh. It has a centripetal effect, removing heavy, unneeded materials to the surface and out.

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

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

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

2.2.3 Ambrosia trifida

Giant Ragweed, Great ragweed, Texan great ragweed, Bitertweed, Bloodweed, Buffalo Weed, Horse Cane
1 tlin 11 cyuc 1 kcaak 1 tcan 3 dwat 2 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli hjonli

drutta Ambrosia trifida is a ANNUAL growing to 2 m (6ft 7in) at a medium rate. It is in flower from August to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy),

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

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

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

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

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

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

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

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

3 2 tlin

3.1 bwon

3.1.1 Phaseolus vulgaris

French Bean, Kidney bean
ftnc2n 2 tlin 11 cyuc 5 kcaak 2 tcan 2 dwat 2 m hkuc
htut cyutli tcup hwicli hrasjlutnyik hpa7tli prikliwis hpa7tmwatli fyikre7t hjonli

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

pcista Large quantities of the raw mature seed are poisonous[10, 65]. Children eating just a few seeds have shown mild forms of poisoning with nausea and diarrhoea, though complete recovery took place in 12 - 24 hours[269]. The toxins play a role in protecting the plant from insect predation[76].

kcakta Edible Parts: Leaves Seed SeedpodEdible Uses: Coffee Coffee CondimentImmature seedpods - raw or cooked[46, 105]. The green pods are commonly used as a vegetable, they have a mild flavour and should only be cooked for a short time. When growing the plant for its seedpods, be sure to pick them whilst they are still small and tender. This will ensure the continued production of more pods by the

plant. Flowering is reduced once the seeds begin to form inside the pods. The immature seeds are boiled or steamed and used as a vegetable[183]. The mature seeds are dried and stored for future use. They must be thoroughly cooked before being eaten and are best soaked in water for about 12 hours prior to this. They can be boiled, baked, pureed, ground into a powder or fermented into 'tempeh' etc[183]. The powdered seed makes a protein-enriching additive to flour; it can also be used in soups etc[K]. The seed can also be sprouted and used in salads or cooked[183]. The roasted seeds have been used as a coffee substitute[7]. Young leaves - raw or cooked as a potherb[177, 183]. The very young leaves are sometimes eaten as a salad, the older leaves are cooked[269].

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

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

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

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

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

3.1.2 *Elaeagnus angustifolia*

Oleaster, Russian olive
tfo2n 2 tlin 7 cyuc 4 kcaak 4 tcan 2 dwat 7 m hkuc
hrtk cyutti hgqatkyuctcup hwilci hyhsrasjlutnyik hpa7tli flatprklwislphsom hpa7tmwattli xre7i hjonli

drutta *Elaeagnus angustifolia* is a deciduous Shrub growing to 7 m (23ft) by 7 m (23ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 2 and is not frost tender. It is in flower in June, and the seeds ripen from

September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline and saline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

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

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

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

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

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

nwatta Agroforestry Services: Nitrogen Agroforestry Services: Windbreak Fodder: Bank Industrial Crop: Biomass Management: Coppice Management: Coppice Management: Standard Minor Global CropLandscape Uses:Screen, Specimen. An easily grown plant, it succeeds in most soils that are well-drained[200], though it dislikes shallow chalk soils[98]. Prefers a light sandy soil that is only moderately fertile[11], succeeding in poor soils and dry soils[11, 200]. Requires a position in full sun, growing very well in hot dry positions[182]. Plants are very drought and wind resistant[1, 166, 200], they tolerate conditions of considerable salinity and alkalinity[227]. A very hardy plant, tolerating temperatures down to about -40°C[184]. However, plants prefer a continental climate[49] and are apt to be cut back in severe winters in Britain because the summer is often not warm enough to have fully ripened the wood[1]. A very variable species[214]. This species is often cultivated in N. Europe for its edible fruits, there are many named varieties and some of these are thornless[214]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by

tcanta Pioneer WoodA fast-growing tree, it rapidly invades bare areas such as logged woodland and soon establishes dense stands of young trees by sending up suckers[226, 229]. It provides excellent conditions for other species of trees to become established and these will eventually out-compete the poplar[229]. The bark has been used to make hats[257]. The bark has sometimes been used for cordage[257]. Wood - soft, light, weak, close-grained, rather woolly in texture, without smell or taste, of low flammability, not durable, very resistant to abrasion[11, 61, 123, 226, 229]. It weighs 25lb per cubic foot[235]. Not strong enough for furniture or construction, it is occasionally used for fences, railings and barn doors, is excellent for cheap crates and boxes and is widely used for pulp, producing a high quality paper[11, 61, 123, 226, 229].

dwatta Alternative Anodyne Antiinflammatory Astringent Diaphoretic Diuretic Febrifuge Nerve Poulitce Salve Stimulant UrinaryAmerican aspen has a long history of herbal use. It was widely employed medicinally by many native North American Indian tribes who valued it especially for its antiseptic and analgesic qualities, using it in the treatment of wounds, skin complaints and respiratory disorders[257]. It is used for the same purposes in modern herbalism. The stem bark is anodyne, anti-inflammatory, antiseptic, astringent, diaphoretic, diuretic, febrifuge, nerve and stimulant[4, 61, 165, 213, 238]. The bark contains salicylates, from which the proprietary medicine aspirin is derived[238]. It is used internally in the treatment of rheumatism, arthritis, gout, lower back pains, urinary complaints, digestive and liver disorders, debility, anorexia, also to reduce fevers and relieve the pain of menstrual cramps[238]. Externally, the bark is used to treat chilblains, haemorrhoids, infected wounds and sprains[238]. The bark is harvested from side branches or coppiced trees and dried for later use[238]. An infusion of the inner bark is considered to be a remedy for coughs[213] and an appetite stimulant, it is also used in the treatment of stomach pains, urinary ailments, VD, worms, colds and fevers[222]. The root is poulticed and applied to cuts and wounds[222]. A tea from the root bark is used as a treatment for excessive menstrual bleeding[222]. The leaf buds are used as a salve for colds, coughs and irritated nostrils[222]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve *Populus tremuloides* American Aspen for haemorrhoids, wounds and burns (see [302] for critics of commission E).

nrakta N. America - Alaska to Newfoundland, south to Mexico. ksacta A pioneer species of old fields, logged or burnt land, it is found in a range of soils from shallow, rocky or clay soils to rich sandy ones. It grows best in rich porous soils with plenty of lime[229]

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

nwatta Landscape Uses:Massing, Specimen. An easily grown plant, it does well in a heavy cold damp soil[1]. Prefers a deep rich well-drained circumneutral soil, growing best in the south and east of Britain[11, 200]. Growth is much less on wet soils, on poor acid soils and on thin dry soils[11]. This species is often found on dry soils in its native habitat and could possibly succeed on dry soils in cultivation[K]. Unlike most members of the genus, this species is drought tolerant once it is established[226]. It is fairly wild tolerant, though it does not do well in exposed upland sites[11]. It dislikes shade and is intolerant of root or branch competition[200]. A fast-growing species that is quite short-lived, though occasional specimens live to almost 200 years[229]. Poplars have very extensive and aggressive root systems that can invade and damage drainage systems. Especially when grown on clay

soils, they should not be planted within 12 metres of buildings since the root system can damage the building's foundations by drying out the soil[11]. Dioecious. Male and female plants must be grown if seed is required. Hybridizes freely with other members of this genus[200]. Special Features: North American native, Inconspicuous flowers or blooms.

3.2.30 *Populus grandidentata*

Canadian Aspen, Bigtooth aspen
2 tlin 5 cyuc 1 kcaak 2 tcan 1 dwat 20 m hkuc
htut cyutti tcup hwilci hrasjlutnyik hpa7tli flatprklwis hpa7tmwattli nyanhjen hjonli

drutta *Populus grandidentata* is a deciduous Tree growing to 20 m (65ft 7in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in March, and the seeds ripen in April. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Inner barkEdible Uses: Inner bark - boiled[46, 61, 105, 161, 257]. There are no more details but inner bark is often dried, ground into a powder and then used as a thickener in soups etc or added to cereals when making bread.

tcanta Pioneer WoodAn excellent pioneer species, establishing well and growing quickly. It provides good growing conditions for other woodland trees. Since this species is intolerant of shade, it will eventually be out-competed by the other trees[229]. Wood - soft, rather woolly in texture, without smell or taste, of low flammability, not durable, very resistant to abrasion[11, 61, 171]. It weighs 29lb per cubic foot[235]. Used mainly for pulp, it makes a high quality paper[11, 61, 123, 171].

dwatta Anodyne Antiinflammatory Febrifuge TonicThe bark of most, if not all members of the genus contain salicin, a glycoside that probably decomposes into salicylic acid (aspirin) in the body[213, 238]. The bark is therefore anodyne, anti-inflammatory, febrifuge and tonic[4, 238]. It is used especially in treating rheumatism and fevers, and also to relieve the pain of menstrual cramps[238]. An infusion of the bark has been used to ease and lessen menstrual flow[257].

nrakta North-eastern N. America - Nova Scotia to Manitoba, south to North Carolina. ksacta Rich moist sandy soils near streams and the borders of swamps from sea level to 900 metres[43, 229].

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

nwatta Landscape Uses:Massing. An easily grown plant, it does well in a heavy cold damp soil[1]. Prefers a deep rich well-drained circumneutral soil, growing best in the south and east of Britain[11, 200]. Growth is much less on wet soils, on poor acid soils and on thin dry soils[11]. It does not do well in exposed upland sites[11]. It dislikes shade and is intolerant of root or branch competition[200]. A fast-growing but short-lived tree[229], it does not appear to thrive in Britain[11], though it is extensively planted for timber in Austria[50]. Trees usually produce suckers and form large thickets in the wild[226]. This species is closely related to *P. tremula*[11]. Poplars have very extensive and aggressive root systems that can invade and damage drainage systems. Especially when grown on clay soils, they should not be planted

Valley for arrhythmia, cardiac insufficiency, nervous heart complaints [see [302] for critics of commission E).

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

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

nwatta Landscape Uses:Border, Container, Erosion control, Ground cover, Massing, Specimen, Woodland, garden Succeeds in almost any situation, including the dense dry shade of large trees[1, 4, 24]. Prefers a position in semi-shade in a moderately fertile well-drained moist woodland soil[200, 208]. Grows well in heavy clay, sand or chalky soils[208]. Dislikes pure clay soils and boggy sites[233]. Plants are hardy to -20°C or lower[200]. A polymorphic species[200]. It is a very ornamental plant, though it can become very invasive once it is established[28]. Plants can take a couple of years to become established[208]. There are several named varieties, selected for their ornamental value[233]. The flowers are sweetly scented[205]. Lily of the valley is occasionally cultivated as a medicinal plant for herbalists and allopaths. Plants seem to be immune to the predations of rabbits[233]. A good bee plant[4]. Special Features: Not North American native, Naturalizing, All or parts of this plant are poisonous, Suitable for cut flowers, Fragrant flowers.

3.2.28 Populus fremontii

Cottonwood, Fremont cottonwood, Fremont Poplar, Western Cottonwood

2 tin 9 cyuc 1 kcak 3 tcan 2 dwat 25 m hkuc htut cyutli kyuctcup hwicli hrasjltutnykfrip hpa7tli flatprik-wisslip hpa7tmwatli nyanhjen hjonli

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

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

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

dwatta Anodyne Antinflammatory Antiscorbutic FebrifugeThe inner bark was consumed by various native

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

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

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

nwatta Landscape Uses:Aggressive surface roots possible. An easily grown plant, it does well in a heavy cold damp soil[1]. Prefers a deep rich well-drained circumneutral soil, growing best in the south and east of Britain[11, 200]. Tolerates extremely alkaline soils[200]. Growth is much less on wet soils, on poor acid soils and on thin dry soils[11]. It does not do well in exposed upland sites[11]. It dislikes shade and is intolerant of root or branch competition[200]. A fast-growing but short-lived species[229]. Some forms of this species are tender in Britain[11]. Poplars have very extensive and aggressive root systems that can invade and damage drainage systems. Especially when grown on clay soils, they should not be planted within 12 metres of buildings since the root system can damage the building's foundations by drying out the soil[11]. Dioecious. Male and female plants must be grown if seed is required. Hybridizes freely with other members of this genus[200]. Special Features: North American native, Wetlands plant, Inconspicuous flowers or blooms.

3.2.29 Populus tremuloides

American Aspen - Poplar, Quaking aspen
2 tin 5 cyuc 1 kcak 3 tcan 3 dwat 20 m hkuc htut cyutli hgatkyuctcup hwicli hrasjltutnyk hpa7tli flatprik-wis hpa7tmwatli nyanhjen hjonli

drutta Populus tremuloides is a deciduous Tree growing to 20 m (65ft) by 10 m (32ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 1. It is in flower in April, and the seeds ripen from May to June. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista Possible toxic effects due to salicylates (e.g. heartburn, tinnitus). Avoid with ulcers, stomach or peptic ulcers [301].

kcakta Edible Parts: Flowers Inner bark SapEdible Uses: Inner bark - raw or cooked[257]. It can be dried, ground into a powder and used as a flour[61, 105, 183, 213, 257]. This is normally mixed with other flours for making bread etc and can also be used as a thickener in soups. It is best used in the spring[172]. Sap - can be tapped and used as a drink[105, 161, 183]. It has also been used as a flavouring with wild strawberries[257]. Catkins - raw or cooked. Bitter[172].

the growing plant but some can also be used by other plants growing nearby[160, 200]. An excellent companion plant, when grown in orchards it can increase yields from the fruit trees by up to 10%. Plants are very tolerant of pruning, they usually resprout freely even when cut right back to the ground. This species is notably resistant to honey fungus[88, 200]. The flowers are sweetly and heavily scented[184]. Special Features: Attractive foliage, Not North American native, Invasive, Naturalizing, Fragrant flowers, Inconspicuous flowers or blooms. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fleshy. Thick or swollen - fibrous or tap root [2-1].

3.1.3 Elaeagnus commutata

Silverberry
tfo2n 2 tin 6 cyuc 3 kcak 4 tcan 2 dwat 3 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjltutnyk hpa7tli flatprik-wisslip hpa7tmwatli xre7t hjonli

drutta Elaeagnus commutata is a deciduous Shrub growing to 3 m (9ft) by 1.5 m (5ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 2 and is not frost tender. It is in flower in May, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

kcakta Edible Parts: Fruit SeedEdible Uses: Fruit - raw or cooked[1, 2, 3, 43, 106]. Dry and mealy[11, 95, 172, 183]. Good when added to soups they also make an excellent jelly[183]. The fruit must be fully ripe before it can be enjoyed raw, if even slightly under-ripe it will be quite astringent[K]. The fruit contains a single large seed[K]. Seed - raw or cooked. It can be eaten with the fruit though the seed case is rather fibrous[K].

tcanta Beads Companion Fibre Hedge Hedge Soap-Plants can be grown as a hedge in exposed positions, tolerating maritime exposure. They have a rather open habit, however, and so do not afford a lot of wind protection. Because they fix atmospheric nitrogen, they enrich the soil and so make a very good companion hedge in orchards etc[K]. The fibrous bark is used in weaving, it has been twisted to make strong ropes and has also been used to make blankets and clothing[99, 257]. Dried fruits are used as beads[99, 257]. The berries have been used to make a soap[257].

dwatta Cancer Salve VDA strong decoction of the bark, mixed with oil, has been used as a salve for children with frostbite[257]. A decoction of the roots, combined with sumac roots (Rhus spp.), has been used in the treatment of syphilis[257]. This medicine was considered to be very poisonous and, if you survived it, you were likely to become sterile[257]. The fruit of many members of this genus is a very rich source of vitamins and minerals, especially in vitamins A, C and E, flavanoids and other bio-active compounds. It is also a fairly good source of essential fatty acids, which is fairly unusual for a fruit. It is being investigated as a food that is capable of reducing the incidence of cancer and also as a means of halting or reversing the growth of cancers[214].

nrakta N. America - Quebec to Alaska and south to Utah, S. Dakota and Minnesota.. ksacta Dry calcareous slopes[43, 184].

propta Seed - best sown as soon as it is ripe in a cold frame[78]. It should germinate in late winter or early spring, though it may take 18 months[K]. Stored seed can be very slow to germinate, often taking more than 18 months. A

warm stratification for 4 weeks followed by 12 weeks cold stratification can help[98]. The seed usually (eventually) germinates quite well[78]. Prick out the seedlings into individual pot as soon as they are large enough to handle and plant out when they are at least 15cm tall. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame. Cuttings of mature wood of the current year's growth, 10 - 12cm with a heel, October/November in a frame[200]. The cuttings are rather slow and difficult to root, leave them for 12 months[113]. Layering in September/October. Takes 12 months[78]. Division of suckers during the dormant season[3, 11]. The larger suckers can be planted out direct into their permanent positions, but it is probably best to pot up smaller suckers and grow them on in a cold frame until they are established.

nwatta An easily grown plant, it succeeds in most soils that are well-drained[200], though it dislikes shallow chalk soils[98]. This last report conflicts rather with the record of its natural habitat, it should grow well on chalk[K]. Prefers a light sandy soil that is only moderately fertile, succeeding in poor and dry soils[11, 200]. Requires a position in full sun[11, 200]. Plants are very drought and wind resistant[1, 11, 200]. A very hardy plant, tolerating temperatures down to about -40°C[184]. However, plants prefer a continental climate and are liable to be cut back in severe winters in Britain mainly because the wood is not fully ripened in our cooler summers. A moderately fast-growing plant[202]. The small flowers are deliciously scented[245]. This species does not normally require pruning but the plant can regenerate from very old wood and so can be cut back severely if required[202]. Plants resent root disturbance and should be placed in their permanent positions as soon as possible[202]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. An excellent companion plant, when grown in orchards it can increase yields from the fruit trees by up to 10%. Often confused with *E. angustifolia* even though it is very distinct[50]. Plants produce suckers quite freely, often sending them up at some distance from the plant[182, K]. This species is notably resistant to honey fungus[88, 200]. The plant is heat tolerant in zones 6 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multi-stemmed with multiple stems from the crown [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2].

3.1.4 Shepherdia canadensis

Buffalo Berry, Russet buffaloberry, Canada Buffaloberry
tfo2n 2 tin 6 cyuc 3 kcak 3 tcan 2 dwat 2.5 m hkuc hmimhtut cyutli hgatkyuctcup hwicli hyishrasjltutnyk hpa7tli flatprik-wis hpa7tmwatli nyanhjen hjonli

drutta Shepherdia canadensis is a deciduous Shrub growing to 2.5 m (8ft 2in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 2 and is not frost tender. It is in flower in April, and the seeds ripen from July to September. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

pcista The fruit contains low concentrations of saponins[101]. Although toxic, these substances are very poorly absorbed by the body and so tend to pass through without causing harm. They are also broken down by thorough cooking. Saponins are found in many plants, including several that are often used for food, such as certain beans. It is advisable not to eat large quantities of food that contain saponins. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K].

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 3, 22, 46, 85, 101]. The fruit can also be dried and used like currants. A tart but pleasant flavour even before a frost, it becomes sweeter after frosts[62]. Another report says that the fruit is bitter and is dried, smoked or pressed into cakes[183]. The fruit was a favourite treat of the North American Indians, they would beat it in an equal quantity of water until a foam with a consistency of beaten eggs was formed. It was important that the berries were not allowed to come into contact with anything greasy since this would prevent it becoming foamy[256]. The foam would then be flavoured with a sweet food such as cooked quamash bulbs or other fruits and then served as a special treat in feasts etc. The taste is bitter sweet and is not always enjoyed the first time it is eaten, though it normally grows on one. Nowadays sugar is used to sweeten it and the confection is called 'Indian ice cream'[183, 256]. The fruit should be used in moderation due to the saponin content[101]. The fruit is about 5mm in diameter[200].

tcanta Hair Repellent SoapBecause of its saponin content, the fruit is a potential soap substitute. It is macerated in water to extract the saponins[172]. A decoction of the branches has been used as a hair tonic for dyeing and curling the hair[257]. The branches were harvested in mid summer, broken up and boiled for 2 - 3 hours in water, until the liquid looked like brown coffee. The liquid was decanted off and bottled without further treatment - it would store for a long time without deterioration. To use, the decoction was rubbed into the hair which was simultaneously curled and dyed a brownish colour[257]. The berries, the froth made from them, or a jelly of the fruit, have been eaten as an insect repellent[257]. It was said that mosquitoes were far less likely to bite a person who had eaten the fruit[257].

dwatta Birthing aid Cathartic Haemostatic Hypotensive Laxative Ophthalmic Poultice Skin Stomachic TB VDBuffalo berry was commonly employed medicinally by several native North American Indian tribes, who used it in the treatment of a range of complaints[257]. It is little, if at all, used in modern herbalism. A poultice of the bark, softened by hot water and mixed with pin cherry bark (*Prunus pensylvanica*), has been used to make a plaster or bandage for wrapping broken limbs[257]. An infusion of the bark has been used as a wash for sore eyes[257]. The roots are antihemorrhagic and cathartic[257]. An infusion of the roots has been used as an aid to childbirth and in the treatment of tuberculosis and the coughing up of blood[257]. A decoction of the stems has been used as a stomach tonic (it was also used to treat stomach cancer) and also in the treatment of constipation, high blood pressure and venereal disease[257]. A decoction of the stems and leaves has been used as a wash in the treatment of sores, cuts and swellings[257]. A decoction of the plant has been used externally as a wash and rub for aching limbs, arthritic joints, head and face sores[257]. The inner bark is laxative[257]. An infusion has been used in the treatment of constipation[257]. The berries have been eaten as a treatment for high blood pressure[257]. The fruit juice has been drunk in the treatment of digestive disorders[257]. It has also been applied externally in the treatment of acne and boils[257].

nrakta N. America - Newfoundland to Alaska, south to British Columbia, New York and New Mexico. ksacta Calcareous rocks, banks and sandy shores[43], usually in partial shade[85].

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

half-ripe wood, July/August in a frame sometimes work[113].

nwatta Landscape Uses:Erosion control, Hedge, Massing, Superior hedge. Succeeds in an ordinary well-drained moisture retentive soil[1, 3, 11]. Tolerates poor dry soils[200] and maritime exposure[182]. Established plants are drought resistant[182]. Plants can accumulate mercury when they are grown in polluted soils[172]. Rarely produces fruits in Britain[182]. Some named varieties have been developed for their ornamental value[200]. 'Xanthocarpa' has yellow fruits, 'Rubra' has red fruits[200]. Plants in this genus are notably resistant to honey fungus[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. Dioecious. Male and female plants must be grown if fruit and seed is required. Special Features: North American native, Inconspicuous flowers or blooms. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2]. The root pattern is a heart root, dividing from the crown into several primary roots going down and out [1-2].

3.1.5 Myrica gale

Bog Myrtle, Sweetgale

tfo2n 2 tin 9 cyuc 2 kcak 4 tcan 2 dwat 2 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjltutnyik hpa7tli frusflatprikllwis hpa7tmwatli nyanhjen hjonli

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

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

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

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

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

nrakta Western Europe, including Britain, from Scandinavia to Portugal, east to N.W. Russia. N. America. ks-

blooms.

3.2.26 Sorbus americana

American Mountain Ash

2 tin 6 cyuc 1 kcak 2 tcan 2 dwat 10 m hkuc hmimhtut cyutli tcup hwicli hysirasjltutnyik hpa7tli flatprikllwis hpa7tmwatli xre7t hjonli

drutta Sorbus americana is a deciduous Tree growing to 10 m (32ft) by 7 m (23ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 2. It is in flower from May to June, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

pcista The seeds probably contain hydrogen cyanide. This is the ingredient that gives almonds their characteristic flavour. Unless the seed is very bitter it should be perfectly safe in reasonable quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[62, 101]. Rich in iron and vitamin C[213, 226]. The fruit is used mainly in making pies, preserves etc, but it can also be eaten raw after a frost because it turns sweeter then[101, 183]. The fruit has a high tannin content and so should only be used in moderation if eaten raw[226]. It can also be dried and ground into a meal[226]. The fruit is produced in dense clusters and is up to 8mm in diameter[200].

tcanta Miscellany WoodWood - soft, light, close grained, with little strength[82, 229, 235]. It weighs about 34lb per cubic foot[235] and is of no commercial value[229].

dwatta Antiscorbatic Antiseptic Appetizer Astringent Blood purifier Digestive Diuretic Laxative Miscellany Vitamin CThe inner bark has astringent and antiseptic properties[213]. It is also used as a blood purifier and appetite stimulant[257]. An infusion is used (sometimes with the terminal buds added) in the treatment of colds, debility, diarrhoea etc[222, 257]. When mixed with sweet flag (*Acorus calamus*) it is used as a tonic[257]. A poultice of the burnt bark has been used in the treatment of boils[257]. The fruit is antiscorbatic, diuretic, mildly laxative, astringent and digestive[226, 257]. It is an ideal accompaniment for foods that are hard to digest[226]. A tea from the berries is antiscorbatic and astringent[213, 222]. It has been used as a rectal wash for piles[213]. It is also used in homeopathic remedies[46, 82].

nrakta Eastern N. America - Newfoundland to N. Carolina, west to Illinois and Manitoba. ksacta Woods, borders of swamps and rocky hillsides[43, 82] at higher elevations[229].

propta Seed - best sown as soon as it is ripe in a cold frame[78, 80]. If you have sufficient seed it can be sown in an outdoor seedbed[78, 80]. Stored seed germinates better if given 2 weeks warm then 14 - 16 weeks cold stratification[98], so sow it as early in the year as possible. Prick out the seedlings into individual pots when they are large enough to handle. Seedlings are very slow to put on top-growth for their first year or two[11], but they are busy building up a good root system. It is best to keep them in pots in a cold frame for their first winter and then plant them out into their permanent positions in late spring.

nwatta Landscape Uses:Specimen. Succeeds in most reasonably good soils in an open sunny position[11]. Tolerates partial shade[188], though it fruits better in a sunny position[K]. Dislikes dry soils[188]. Able to succeed in poor soils and to become established on exposed open ground[229]. A slow-growing and relatively short-lived tree in the wild[229], it fruits freely in Britain[11]. Plants are susceptible to fireblight[188]. Special Features:Attracts birds, North American native, Attractive flowers or blooms. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of

"heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

3.2.27 Convallaria majalis

Lily Of The Valley, European lily of the valley

2 tin 7 cyuc 1 kcak 3 tcan 3 dwat m hkuc pcmihmimhtut cyutli kyuctcuphja7n hwicli hysirasjltutnyik hpa7tli flatprikllwis hpa7tmwatli fyfikre7t hjonli

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

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

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

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

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

seedlings out into individual pots and plant them out after the last expected frosts.

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

3.2.24 Tagetes patula

French Marigold, Dwarf French Marigold

2 tlin 11 cyuc 2 kcak 4 tcan 2 dwat 0.5 m hkuc htut cyutli kyucucup hwicli hrasjlutnyikfrip hpa7tli flatprikliw hpa7tmwattli xre7t hjonli

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

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

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

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

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

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

nwatta Requires a well-drained moderately fertile soil in a sunny position[200]. Grows well in heavy clay soils and in sandy soils[188]. A very ornamental plant[1], there are many named varieties[188]. A good butterfly plant[30]. Removing dead flowers before the seed is formed will extend the

flowering season[188]. The bruised leaves emit a refreshing pungent smell[245]. Plants are prone to slugs, snails and botrytis[188]. The French marigold is often used as a companion plant, especially for growing amongst tomatoes and potatoes where it helps to repel pests[238]. See 'Other uses' below for more details.

3.2.25 Populus simonii

Simon poplar, Chinese Poplar

2 tlin 5 cyuc 1 kcak 2 tcan 1 dwat 30 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliw hpa7tmwattli nyanhjen hjonli

drutta Populus simonii is a deciduous Tree growing to 30 m (98ft 5in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 2. It is in flower from April to June, and the seeds ripen from May to July. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcka Edible Parts: LeavesEdible Uses: Young leaves - cooked[105, 177].

tcanta Rooting hormone WoodAn extract of the shoots can be used as a rooting hormone for all types of cuttings. It is extracted by soaking the chopped up shoots in cold water for a day[172]. Wood - soft, rather woolly in texture, without smell or taste, of low flammability, not durable, very resistant to abrasion[11].

dwatta Anodyne Antiinflammatory FebrifugeAlthough no specific mention has been seen for this species, the bark of most, if not all members of the genus contain salicin, a glycoside that probably decomposes into salicylic acid (aspirin) in the body[213, 238]. The bark is therefore anodyne, anti-inflammatory and febrifuge. It is used especially in treating rheumatism and fevers, and also to relieve the pain of menstrual cramps[238].

nrakta E. Asia - N. China. ksacta River valleys, by streams etc, often in sandy soils[109]. Mountains, plains, alluvial deposits and valleys from near sea level to 3000 metres[266].

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

nwatta An easily grown plant, it does well in a heavy cold damp soil[1]. Prefers a deep rich well-drained circum-neutral soil, growing best in the south and east of Britain[11, 200]. Growth is much less on wet soils, on poor acid soils and on thin dry soils[11]. It does not do well in exposed upland sites[11]. It dislikes shade and is intolerant of root or branch competition[200]. Plants are susceptible to bacterial canker[11]. The leaf buds, as they swell in the spring, and the young leaves have a pleasing fragrance of balsam[245]. The fragrance is especially pronounced as the leaves unfold[245]. This species is often planted for timber in central Europe and occasionally elsewhere in Europe[50]. Poplars have very extensive and aggressive root systems that can invade and damage drainage systems. Especially when grown on clay soils, they should not be planted within 12 metres of buildings since the root system can damage the building's foundations by drying out the soil[11]. Dioecious. Male and female plants must be grown if seed is required. Hybridizes freely with other members of this genus[200]. Special Features: Not North American native, Inconspicuous flowers or

acta Bogs, marshes, fens and wet heathland in acid soils but plants are occasionally found in calcareous fens[5, 17, 186].

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

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

3.1.6 Alnus sinuata

Sitka Alder

tfo2n 2 tlin 9 cyuc 1 kcak 3 tcan 1 dwat 4 m hkuc hmimhtut cyutli tcuphja7n hwicli hysisjlutnyikfrip hpa7tli flatprikliw hpa7tmwattli hjonli

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

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

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

tcanta Fuel Pioneer Soil stabilization Tannin WoodThis is an excellent pioneer species for re-establishing woodlands on disused farmland, difficult sites etc[226]. Its fast rate of growth means that it quickly provides sheltered conditions

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

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

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

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

nwatta Prefers a heavy soil and a damp situation[1, 11]. Grows well in heavy clay soils[11]. Tolerates very infertile sites[200]. This species is closely related to *A. viridis* and is included as a sub-species of *A. viridis* by many botanists[11]. A fast-growing but short-lived species, rarely living longer than 50 years[229]. It is a pioneer species of logged or burnt land, often forming dense thickets in low wet areas[229]. This species has a symbiotic relationship with certain soil micro-organisms, these form nodules on the roots of the plants and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

3.1.7 Lathyrus odoratus

Sweet Pea, Wild Pea, Vetchling

tfo2n 2 tlin 11 cyuc 1 kcak 3 tcan 0 dwat 2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliw hpa7tmwattli xre7t hjonli

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

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

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

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

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

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

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

3.1.8 *Alnus rugosa*

Speckled Alder

tfo2n 2 tin 6 cyuc 0 kcak 3 tcan 2 dwat 22 m hkuc hmimhtut cyutli tcuphja7n hwicli hysijlutnykfrip hpa7tli flat-prikkwis hpa7tmwatli hjonli

drutta *Alnus rugosa* is a deciduous Tree growing to 22 m (72ft 2in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 2. It is in flower in May, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. It can fix Nitrogen. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

tcanta Dye Pioneer Soil stabilization WoodThis is an excellent pioneer species for re-establishing woodlands on disused farmland, difficult sites etc[226]. Its fast rate of growth means that it quickly provides sheltered conditions to allow more permanent woodland trees to become established. In addition, bacteria on the roots fix atmospheric nitrogen - whilst this enables the tree to grow well in quite poor soils it also makes some of this nitrogen available to other plants growing nearby. Alder trees also have a heavy leaf canopy and when the leaves fall in the autumn they help to build up the humus content of the soil. Alder seedlings do not compete well in shady woodland conditions and so this species gradually dies out as the other trees become established[K]. The tree has an extensive root system and can be planted to control banks from erosion[226]. A dark dye is obtained from the bark[226]. Browns, through red to orange colours can be obtained from the bark[257]. The wood is soft, weighing 29lb per cubic foot[235]. The tree is too small to be of importance for lumber or fuel[229].

dwatta Alternative Anodyne Astringent Cathartic Emetic Febrifuge Odontalgic Ophthalmic Stomachic TonicThe speckled alder was quite widely used medicinally by the native North American Indians who used it to treat a variety of complaints[257]. It is little used in modern herbalism. The bark is alterative, astringent, emetic, laxative, ophthalmic, stomachic and tonic[46, 61, 257]. The bark contains salicin[226], which probably decomposes into salicylic acid (closely related to aspirin) in the human body[213]. This is used as an anodyne and febrifuge[226]. The root bark was mixed with molasses and used in the treatment of toothache[257]. A decoction of the inner bark was used as a wash for sore eyes[257]. The outer bark is astringent and is applied as a poultice to bleeding wounds, it also reduces swellings[226].

nrakta Northern and Eastern N. America - Hudson's Bay to Virginia. Naturalized in C. Europe[50]. ksacta Wet sandy or gravelly soils, usually along streams and rivers, but also in ponds and swamps[229]. It is only found in open sunny areas, being unable to compete in dense shade[229].

propta Seed - best sown in a cold frame as soon as it is ripe and only just covered[200]. Spring sown seed should also germinate successfully so long as it is not covered[200,

K]. The seed should germinate in the spring as the weather warms up. When large enough to handle, prick the seedlings out into individual pots. If growth is sufficient, it is possible to plant them out into their permanent positions in the summer, otherwise keep them in pots outdoors and plant them out in the spring. If you have sufficient quantity of seed, it can be sown thinly in an outdoor seed bed in the spring[78]. The seedlings can either be planted out into their permanent positions in the autumn/winter, or they can be allowed to grow on in the seed bed for a further season before planting them. Cuttings of mature wood, taken as soon as the leaves fall in autumn, outdoors in sandy soil.

nwatta Prefers a heavy soil and a damp situation[1, 11]. Grows well in heavy clay soils[11]. Tolerates very infertile sites[200]. A fast-growing but short-lived tree[229]. Closely related to *A. incana*[11] and considered to be no more than a sub-species (*A. incana rugosa*) by some botanists[226]. This species has a symbiotic relationship with certain soil micro-organisms, these form nodules on the roots of the plants and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2].

3.1.9 *Alnus incana*

Grey Alder, Speckled alder, Tcan dwarf alder, White Alder tfo2n 2 tin 6 cyuc 0 kcak 3 tcan 0 dwat 18 m hkuc hmimhtut cyutli kyucetcuphja7n hwicli hysijlutnykfrip hpa7tli flatprikkwis hpa7tmwatli hjonli

drutta *Alnus incana* is a deciduous Tree growing to 18 m (59ft) by 5 m (16ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 2. It is in flower from February to March. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. It can fix Nitrogen. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry moist or wet soil. The plant can tolerate maritime exposure.

tcanta Pioneer Soil reclamation Tannin WoodThis species fixes atmospheric nitrogen and is also tolerant of polluted soils, it can be used for land reclamation, especially on coal tips[200]. This is an excellent pioneer species for re-establishing woodlands on disused farmland, difficult sites etc. Its fast rate of growth means that it quickly provides sheltered conditions to allow more permanent woodland trees to become established. In addition, bacteria on the roots fix atmospheric nitrogen - whilst this enables the tree to grow well in quite poor soils it also makes some of this nitrogen available to other plants growing nearby. Alder trees also have a heavy leaf canopy and when the leaves fall in the autumn they help to build up the humus content of the soil. Alder seedlings do not compete well in shady woodland conditions and so this species gradually dies out as the other trees become established[K]. The bark and the fruits contain up to 20% tannin[46, 61, 223]. Wood - light, soft, fairly elastic, easy to split. Used for clogs, bowls, woodcuts etc. Much valued by cabinet makers[46, 61].

nrakta Europe. Introduced in Britain[17]. ksacta Mountains, especially on poor soil[17, 50].

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

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

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

3.2.22 *Cornus sericea*

Red Osier Dogwood, Western dogwood

2 tin 7 cyuc 2 kcak 4 tcan 2 dwat 2.5 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnykfrip hpa7tli flat-prikkwis hpa7tmwatli xre7t hjonli

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

ksacta Edible Parts: Fruit Oil SeedEdible Uses: Oil OilFruit - raw or cooked[105, 161, 257]. Juicy[101]. Bitter and unpalatable according to some reports[2], it was mixed with other fruits such as juneberries (*Amelanchier* spp) and then dried for winter use by native North Americans[257]. The fruit can cause nausea[172]. The fruit is up to 9mm in diameter[200]. Seed[101]. No more details are given, but the seeds are quite small and woody, looking rather less than edible[K]. An edible oil is obtained from the seed[4].

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

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

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

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

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

3.2.23 *Tagetes tenuifolia*

Lemon Marigold, Striped Mexican Marigold, Signet Marigold 2 tin 11 cyuc 2 kcak 3 tcan 0 dwat 0.8 m hkuc htut cyutli kyucutp hwicli hrasjlutnykfrip hpa7tli flat-prikkwis hpa7tmwatli xre7t hjonli

drutta *Tagetes tenuifolia* is a ANNUAL growing to 0.8 m (2ft 7in) by 0.8 m (2ft 7in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

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

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

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

propta Seed - sow March in a greenhouse. Only just cover the seed. Germination usually takes place within 2 weeks. When they are large enough to handle, prick the

pecially by streams, avoiding acid soils[17]. Locally common on enriched soils below bird roosts[200].

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

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

3.2.20 Malus baccata

Chinese Crab, Siberian crab apple

2 tlin 7 cyuc 2 kcaak 2 tcan 1 dwat 15 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnykfrip hpa7tli flatprklwis hpa7tmwatli fyfxre7t hjonli

drutta Malus baccata is a deciduous Tree growing to 15 m (49ft) by 15 m (49ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 2 and is not frost tender. It is in flower from April to May, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

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

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

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

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

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

the cold in their first winter. Otherwise, keep them in pots in a cold frame and plant them out in late spring of the following year. Cuttings of mature wood, November in a frame[11].

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

3.2.21 Viburnum dentatum

Arrow Wood, Southern arrowwood, Southern Arrowwood Viburnum

2 tlin 8 cyuc 2 kcaak 0 tcan 1 dwat 4.5 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyk hpa7tli flatprklwis hpa7tmwatli dyatxre7t hjonli

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

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

dwatta Birthing aid ContraceptiveA decoction of the twigs has been taken by women to prevent conception[257]. A poultice of the plant has been applied to the swollen legs of a woman after she has given birth[257]. Both of the above uses are for the sub-species V. dentatum lucidum. Ait.[257].

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

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

Cuttings of mature wood, taken as soon as the leaves fall in autumn, outdoors in sandy soil.

nwatta Landscape Uses:Pollard, Specimen. Prefers a heavy soil and a damp situation[1, 11]. Grows well in heavy clay soils[11]. Thrives in drier soils than many other members of this genus[200]. Tolerates very infertile sites[200]. This species has a symbiotic relationship with certain soil micro-organisms, these form nodules on the roots of the plants and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. Special Features:Attractive foliage, Not North American native, Wetlands plant, Inconspicuous flowers or blooms. The plant is heat tolerant in zones 6 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

3.2 mran

3.2.1 Cucurbita moschata

Squash, Crookneck squash

2 tlin 11 cyuc 5 kcaak 1 tcan 3 dwat m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyk hpa7tli flatprklwis hpa7tmwatli fyf hjonli

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

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

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

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

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

nrakta Origin is obscure. ksacta Not known in the wild. propta Seed - sow early to mid spring in a greenhouse in a rich soil. Germination should take place within 2 weeks.

Sow 2 or 3 seeds per pot and thin out to the best plant. Grow them on fast and plant out after the last expected frosts, giving them cloche or frame protection for at least their first few weeks if you are trying them outdoors.

nwatta Requires a rich, well-drained moisture retentive soil and a very warm, sunny and sheltered position[1, 37, 86]. Prefers a pH of 5.5 to 5.9, but tolerates up to 6.8[86]. Moderate rainfall favours growth, but the roots of most cultivars are sensitive to high soil-water levels[200]. The squash is a frost-tender annual plant that is widely cultivated, especially in warm temperate and tropical areas, for its edible fruit[27]. There are very many named varieties widely differing in size shape and taste[27, 183]. Some varieties are used in the summer and autumn whilst others are harvested in the autumn and can be stored for several months. Succeeds outdoors most years in Britain[27]. Plants are more suited to warmer climates than Britain[200] and are only rarely successful in good summers in this country, they do not do well in the north[86]. Most cultivars are day-length neutral[200]. This species only hybridizes with other members of the genus under controlled conditions[86, 135]. Grows well with sweetcorn, radishes and nasturtium but dislikes potatoes[18, 20]. Squashes and pumpkins can be differentiated from each other by their fruit stalk, it is angular and polygonal in pumpkins but thick, soft and round in squashes[132].

3.2.2 Rubus arcticus

Arctic Bramble, Arctic raspberry, Dwarf raspberry

2 tlin 7 cyuc 5 kcaak 1 tcan 0 dwat 0.2 m hkuc
htut cyutli tcup hwicli hrasjlutnyk hpa7tli frusflatprklwis hpa7tmwatli xre7t hjonli

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

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

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

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

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

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

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

3.2.3 Brassica oleracea italica

Broccoli

2 tlin 11 cyuc 5 kcaak 2 tcan 0 dwat 0.9 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliw
hpa7tmwatli fyifkre7t hjonli

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

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

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

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

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

nwatta Succeeds in full sun in a well-drained fertile preferably alkaline soil[16, 200]. Tolerates a pH in the range 4.3 to 8.3. Prefers a heavy soil[16]. Succeeds in any reasonable soil[33]. Succeeds in maritime gardens[200]. Some forms are very cold-hardy, tolerating temperatures down to about -17°C[200]. Broccoli is closely related to the cauliflowers (*C. oleracea botrytis*) and is often grown for its edible young flowering stems which, by careful selection of varieties, can be available almost all year round from early summer right round to late spring. There are many named varieties and these can be classified into three main groups: Calabrese, which matures in summer and autumn, is the least cold-hardy form. It produces green, or sometimes purple, flowering heads[264]. Some forms will produce a number of side shoots once the main head has been harvested, though other forms seem unable to do this[264]. Romanesco matures in late summer and the autumn. It has numerous yellowish-green conical groups of buds arranged in spirals[264]. Given a little protection from the cold, it is possible to produce a crop throughout the winter. Unlike the other types of broccoli, romanesco seems unable to produce side shoots once the main head has been harvested[264]. Sprouting broccoli is the most cold-hardy group. It does not form a central head like the other two groups but instead produces a mass of side shoots from early spring until early summer. The more you harvest these shoots, especially if you do so before the flowers open, then the more shoots the plant produces[K]. A good companion for celery and other aromatic plants since these seem to reduce insect predations[18, 20]. Grows badly with potatoes, beet and onions[20]. Grows well with potatoes, beet and onions according to another report[20].

3.2.4 Viburnum lentago

Sheepberry, Nannyberry, Nannyberry Viburnum

2 tlin 8 cyuc 4 kcaak 0 tcan 1 dwat 9 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliw
hpa7tmwatli dyatre7t hjonli

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

kcakta Edible Parts: Fruit Edible Uses: Fruit - raw or cooked[2, 3, 55, 62, 65, 257]. It can also be dried for winter use[55]. The fruit is variable in size and quality, the best being about 15mm long, pulpy, very sweet, somewhat juicy and pleasant tasting but with a thick skin and a single large seed[43, 82, 101, 159, 183]. The fruit is said to be best after a frost[102] but it is sometimes dry[159].

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

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

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

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

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

white pine blister rust, so should not be grown in the vicinity of pine trees[155]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features: Not North American native, Inconspicuous flowers or blooms.

3.2.18 Calendula officinalis

calendula, Pot Marigold

2 tlin 11 cyuc 3 kcaak 4 tcan 5 dwat 0.6 m hkuc
hmimhtut cyutli tcup hwicli hyishrasjlutnyik hpa7tli frusflatprikliwslip hpa7tmwatli hjonli

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

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

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

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

dwatta Antiphlogistic Antiseptic Antispasmodic Aperient Astringent Chologogue Diaphoretic Emmenagogue Homeopathy Skin Stimulant Vulnery Warts Pot marigold is one of the best known and versatile herbs in Western herbal medicine and is also a popular domestic remedy[4, 254]. It is, above all, a remedy for skin problems and is applied externally to bites and stings, sprains, wounds, sore eyes, varicose veins etc[4, 254]. It is also a cleansing and detoxifying herb and is taken internally in treating fevers and chronic infections[4, 254]. Only the common deep-orange flowered variety is considered to be of medicinal value[4]. The whole plant, but especially the flowers and the leaves, is antiphlogistic, antiseptic, antispasmodic, aperient, astringent, chologogue, diaphoretic, emmenagogue, skin, stimulant and vulnery[4, 7, 9, 21, 46, 165, 201]. The leaves can be used fresh or dried, they are best harvested in the morning of a fine sunny day just after the dew has dried from them[4]. The flowers are also used fresh or dried, for drying they are harvested when fully open and need to be dried quickly in the shade[4]. A tea of the petals tones up the circulation and, taken regularly, can ease varicose veins[201]. An application of the crushed stems to corns and

warts will soon render them easily removable[7]. The leaves, blossoms and buds are used to make a homeopathic remedy[232]. It is used internally in order to speed the healing of wounds[232]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve *Calendula officinalis* for inflammation of the mouth and pharynx (throat), wounds and burns (see [302] for critics of commission E).

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

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

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

3.2.19 Oxymyria digyna

Mountain Sorrel, Alpine mountainsorrel

2 tlin 8 cyuc 3 kcaak 0 tcan 1 dwat 0.5 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliw
hpa7tmwatli xre7t hjonli

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

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

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

dwatta Antiscorbatic Astringent Dysentery Vitamin C The leaves are rich in vitamin C and are used to treat scurvy[212]. The roots, stems and leaves are cooked and eaten in the treatment of dysentery[272].

nrakta Mountains of the northern temperate zone, including Britain. ksacta Damp rocky places on mountains, es-

spring. Layering of current seasons growth in July/August. Takes 15 months[78].

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

3.2.16 *Tagetes erecta*

African Marigold, Aztec marigold, Big Marigold, American Marigold
2 tlin 11 cyuc 3 kcak 3 tcan 3 dwat 1 m hkuc
htut cyutli kyuctcup hwicli hrasjnutnykfrip hpa7tli flatprikliw hpa7tmwatli xre7t hjonli

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

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

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

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

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

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

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

3.2.17 *Ribes alpinum*

Alpine Currant
2 tlin 7 cyuc 3 kcak 4 tcan 0 dwat 1.2 m hkuc
hmimhtut cyutli tcup hwicli hysrasjnutnyk hpa7tli flatprikliw hpa7tmwatli nyanhjen hjonli

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

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

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

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

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. Stored seed requires 3 months cold stratification at 0 - 9°C and should be sown as early in the year as possible[113, 164]. Under normal storage conditions the seed can remain viable for 17 years or more. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter, planting them out in late spring of the following year. Cuttings of half-ripe wood, July/August in a frame[113]. Cuttings of mature wood of the current year's growth, preferably with a heel of the previous year's growth, November to February in a cold frame or sheltered bed outdoors[78, 200].

nwatta Landscape Uses:Erosion control, Foundation, Ground cover, Massing, Rock garden, Seashore. Easily grown in a moisture retentive but well-drained loamy soil of at least moderate fertility[11, 200]. This species succeeds on poor soils[11]. Does well in shade though it does not fruit so well in such a position[11]. A very hardy plant, tolerating temperatures down to about -25°C[184]. A number of named varieties have been developed for their ornamental value. The flowers are sweetly fragrant[208]. Plants are dioecious. At least one male plant must be grown in the vicinity of up to 5 females if fruit is required. Plants can harbour a stage of

growth habit is multistemmed with multiple stems from the crown [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2].

3.2.5 *Asparagus officinalis*

Asparagus, Garden asparagus
2 tlin 9 cyuc 4 kcak 2 tcan 3 dwat 1.5 m hkuc
hmimhtut cyutli tcup hwicli hrasjnutnyk hpa7tli frusflatprikliwssilphsomo hpa7tmwatli nyanhjen hjonli

drutta *Asparagus officinalis* is a PERENNIAL growing to 1.5 m (5ft) by 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in August, and the seeds ripen from September to October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees. The plant is not self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid, very alkaline and saline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

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

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

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

dwatta Antibiotic Antispasmodic Aperient Cancer Cardiac Demulcent Diaphoretic Diuretic Laxative Sedative Tonic UrinaryAsparagus has been cultivated for over 2,000 years as a vegetable and medicinal herb[238]. Both the roots and the shoots can be used medicinally, they have a restorative and cleansing effect on the bowels, kidneys and liver[238]. The plant is antispasmodic, aperient, cardiac, demulcent, diaphoretic, diuretic, sedative and tonic[4, 21, 165, 201, 240]. The freshly expressed juice is used[4]. The root is diaphoretic, strongly diuretic and laxative[9, 218, 222]. An infusion is used in the treatment of jaundice and congestive torpor of the liver[240]. The strongly diuretic action of the roots make it useful in the treatment of a variety of urinary problems including cystitis[254]. It is also used in the treatment of cancer[218]. The roots are said to be able to lower blood pressure[7, 222]. The roots are harvested in late spring, after the shoots have been cut as a food crop, and are dried for later use[7]. The seeds possess antibiotic activity[222]. Another report says that the plant contains asparagusic acid which is nematocidal and is used in the treatment of schistosomiasis[238].

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

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

nwatta Easily grown in any good garden soil[16]. Prefers a rich well-drained sandy loam and a sunny position[1, 16, 27, 238]. Prefers a pH of 6.5 or higher[200], though it tolerates a pH in the range 4.3 to 8.2. Asparagus is often cultivated as a luxury vegetable, there are some named varieties[16, 183]. Well-tended plants can be long-lived, an asparagus bed can last for well over 20 years. Asparagus is a good companion plant for tomatoes, parsley and basil[18, 20,

201]. When grown together, tomatoes help to protect asparagus from the asparagus beetle[201]. Asparagus is said to repel the nematodes that can infect tomatoes[201] (see the report below on the plants other uses). A good bee plant[108]. Dioecious. Male and female plants must be grown if seed is required. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

3.2.6 *Cucurbita argyrosperma*

Cushaw Pumpkin
2 tlin 11 cyuc 4 kcak 1 tcan 2 dwat 0.5 m hkuc
hmimhtut cyutli tcup hwicli hrasjnutnyk hpa7tli flatprikliw hpa7tmwatli fyif hjonli

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

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

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

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

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

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

nwatta Requires a rich, well-drained moisture retentive soil and a very warm, sunny and sheltered position[1]. Plants are tolerant of high temperatures but sensitive to cool conditions, they favour moderate rainfall but the roots are sensitive to water-logging[200]. A frost-tender annual plant, the Cushaw pumpkin has long been cultivated for its edible fruit

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

3.2.7 Raphanus sativus niger

Oriental Radish
2 tin 11 cyuc 4 kcaak 3 tcan 3 dwat 0.5 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli prkikwis
hpa7tmwatli xre7t hjonli
drutta Raphanus sativus niger is a ANNUAL growing to 0.5 m (1ft 8in) by 0.2 m (0ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from June to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

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

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

dwatta Anthelmintic Antibacterial Antifungal Antiscolobutic Antispasmodic Astringent Cancer Carminative Cholagogue Digestive Diuretic Expectorant Laxative Poulitice Stomachic Radishes have long been grown as a food crop, but they also have various medicinal actions. The roots stimulate the appetite and digestion, having a tonic and laxative effect upon the intestines and indirectly stimulating the flow of bile[254]. Consuming radish generally results in improved digestion, but some people are sensitive to its acidity and robust action[254]. The plant is used in the treatment of intestinal parasites, though the part of the plant used is not

specified[147]. The leaves, seeds and old roots are used in the treatment of asthma and other chest complaints[218]. The juice of the fresh leaves is diuretic and laxative[240]. The seed is carminative, diuretic, expectorant, laxative and stomachic[176, 218, 240]. It is taken internally in the treatment of indigestion, abdominal bloating, wind, acid regurgitation, diarrhoea and bronchitis[238]. The root is antiscorbatic, antispasmodic, astringent, cholagogue, digestive and diuretic[21, 218]. It is crushed and used as a poultice for burns, bruises and smelly feet[218]. Radishes are also an excellent food remedy for stone, gravel and scorbatic conditions[4]. The root is best harvested before the plant flowers[21]. Its use is not recommended if the stomach or intestines are inflamed[21]. The plant contains raphanin, which is antibacterial and antifungal[218, 238]. It inhibits the growth of Staphylococcus aureus, E. coli, streptococci, Pneumococci etc[176]. The plant also shows anti-tumour activity[218].

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

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

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

3.2.8 Cucurbita pepo

Pumpkin, Field pumpkin, Ozark melon, Texas gourd
2 tin 11 cyuc 4 kcaak 2 tcan 3 dwat 0.6 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprkikwis
hpa7tmwatli fyih hjonli

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

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

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

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

3.2.14 Vitis riparia

Riverbank Grape
2 tin 6 cyuc 3 kcaak 2 tcan 0 dwat 15 m hkuc
hmimhtut cyutli kyucutp hwicli hrasjlutnyik hpa7tli flatprkikwis hpa7tmwatli xre7t hjonli

drutta Vitis riparia is a deciduous Climber growing to 15 m (49ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 2 and is not frost tender. It is in flower from May to July, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Fruit Leaves Sap Shoots Edible Uses: Fruit - raw or dried for later use[22, 46, 62, 161, 183]. Juicy and somewhat acid[183]. The taste is best after a frost[101]. The fruit is about 6 - 12mm in diameter[200] and is carried in fairly large bunches[K]. Leaves - cooked[55, 159]. Young leaves are wrapped around other foods and then baked, they impart a pleasant flavour. Young tendrils - raw or cooked[55, 85, 159]. Sap - raw[101, 161]. A sweet flavour, it is used as a drink[183]. The sap can be harvested in the spring and early summer, though it should not be taken in quantity or it will weaken the plant[K].

tcanta Dye Rootstock A yellow dye is obtained from the fresh or dried leaves[168]. The plant is used as a rootstock for the common grape, V. vinifera, especially in areas where phylloxera disease is prevalent[183].

nrakta Eastern and Central N. America. Locally naturalized in Europe[50]. ksacta Riverbanks, bottomlands, rich thickets and woodland margins[43, 62].

propta Seed - best sown in a cold frame as soon as it is ripe[K]. Six weeks cold stratification improves the germination rate, and so stored seed is best sown in a cold frame as soon as it is obtained. Germination should take place in the first spring, but sometimes takes another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant out in early summer. Cuttings of mature wood of the current seasons growth, December/January in a frame. These cuttings can be of wood 15 - 30cm long or they can be of short sections of the stem about 5cm long with just one bud at the top of the section. In this case a thin, narrow strip of the bark about 3cm long is removed from the bottom half of the side of the stem. This will encourage callusing and the formation of roots. Due to the size of these cuttings they need to be kept in a more protected environment than the longer cuttings. Layering.

nwatta Prefers a deep rich moist well-drained moderately fertile loam[1, 200]. Grows best in a calcareous soil[200]. Succeeds in sun or partial shade though a warm sunny position is required for the fruit to ripen[200]. The young growth in spring can be damaged by late frosts. Plants climb by means of tendrils[182]. They grow particularly well into elm trees[18]. Any pruning should be carried out in winter when the plants are dormant otherwise they bleed profusely[182, 200]. Occasionally cultivated for its edible fruit in N. America[46], there are some named varieties[183]. 'Brandt' is of uncertain parentage, probably involving this

species, it usually ripens its fruit in S.E. England[11]. Resistant to Phylloxera disease, a disease that almost destroyed the European grape crops. This species can be used as a rootstock in areas where the disease is prevalent and can also be used in breeding programmes with V. vinifera in order to impart resistance to that species[183]. The flowers are powerfully scented of mignonette[245]. Plants in this genus are notably susceptible to honey fungus[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. Woody. Growth habit is a single or multiple shooting vine from a crown [1-2].

3.2.15 Viburnum trilobum

American Cranberry, Highbush Cranberry, Cranberrybush, American Cranberrybush Viburnum
2 tin 7 cyuc 3 kcaak 0 tcan 1 dwat 3 m hkuc
hmimhtut cyutli hgattcup hwicli hrasjlutnyikrip hpa7tli flatprkikwis hpa7tmwatli fyixre7t hjonli

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

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

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

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

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

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

out into their permanent positions in the winter[78, 80, 113, 134].

nwatta Landscape Uses:Firewood, Specimen. A very easily grown plant, it tolerates most soils including poor ones[1, 24], sandy soils[188] and heavy clays. It prefers a well-drained loamy soil in a sunny position[11, 200]. It is occasionally found on calcareous soils in the wild but it generally prefers a pH below 6.5, doing well on acid soils[186]. Fairly wind tolerant[200] though it becomes wind shaped when exposed to strong winds[K]. The silver birch is a very ornamental tree[1] with many named varieties[11, 200]. It also has a very wide range of economic uses. It is a fast growing tree, increasing by up to 1 metre a year, but is short-lived[17, 200]. It is often one of the first trees to colonize open land and it creates a suitable environment for other woodland trees to follow[17]. These trees eventually out-compete and shade out the birch trees[17, 186]. It makes an excellent nurse tree for seedling trees, though its fine branches can cause damage to nearby trees when blown into them by the wind. Trees take about 15 years from seed to produce their own seed[98]. Although closely related, it does not usually hybridize with *B. pubescens*[11]. It often hybridizes with *B. pubescens* according to another report[186]. A superb tree for encouraging wildlife, it has 229 associated insect species[24]. A good plant to grow near the compost heap, aiding the fermentation process[14, 20]. It is also a good companion plant, its root action working to improve the soil[14]. Trees are notably susceptible to honey fungus[200]. Special Features: Not North American native, Attractive flowers or blooms.

3.2.13 *Betula pubescens*

White Birch, Downy birch

2 tlin 9 cyuc 3 kcaak 5 tcan 3 dwat 20 m hkuc

htut cyuti kyucctuphja7n hwicli yhisrhasjlutnyikfrip hpa7tli frusflatprikwihs hpa7tmwatli hjonli

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

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

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

tcanta Adhesive Besom Charcoal Compost Dye Essential Fibre Fungicide Miscellany Paper Pioneer Polish Repellent Tannin Thatching Waterproofing WoodThe bark is used

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

dwatta Antirheumatic Antiseborrheic Astringent Bitter Diaphoretic Diuretic Eczema Lanthotropic Miscellany Skin UrinaryAnti-inflammatory, cholagogue, diaphoretic[21, 165, 201]. The bark is diuretic and laxative[7]. The inner bark is bitter and astringent, it is used in treating intermittent fevers[4]. An oil obtained from the inner bark is astringent and is used in the treatment of various skin afflictions, especially eczema and psoriasis[4, 238]. The bark is usually obtained from trees that have been felled for timber and can be distilled at any time of the year[238]. The buds are balsamic[7]. The young shoots and leaves secrete a resinous substance which has acid properties, when combined with alkalis it is a tonic laxative[4]. The leaves are anticholesterolic and diuretic[7]. They also contain phytoalexins, which are effective germicides[7]. An infusion of the leaves is used in the treatment of gout, dropsy and rheumatism, and is recommended as a reliable solvent of kidney stones[4]. The young leaves and leaf buds are harvested in the spring and dried for later use[238]. A decoction of the leaves and bark is used for bathing skin eruptions[4]. The vernal sap is diuretic[4]. The boiled and powdered wood has been applied to chafed skin[257]. Moxa is made from the yellow fungous excrescences of the wood, which sometimes swell out of the fissures[4]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve *Betula* species for infections of the urinary tract, kidney and bladder stones, rheumatism (see [302] for critics of commission E).

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

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

183]. Leaves and young stems - cooked as a potherb[135, 183]. A nutritional analysis is available[218]. Flowers and flower buds - cooked or dried for later use[135, 183]. A nutritional analysis is available[218]. Root - cooked[179]. We have some doubts on this report[K].

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

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

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

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

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

with other edible members of this genus[135]. Squashes and pumpkins can be differentiated from each other by their fruit stalk, it is angular and polygonal in pumpkins but thick, soft and round in squashes[132]. Pumpkins grow well with sweetcorn and thornapple but they dislike growing near potatoes[18, 20, 201]. They also grow well with nasturtiums, mint, beans and radishes[201].

3.2.9 *Raphanus sativus*

Radish, Cultivated radish

2 tlin 11 cyuc 4 kcaak 0 tcan 3 dwat 0.5 m hkuc

hmimttut cyuti tcup hwicli hrasjlutnyik hpa7tli priklwis hpa7tmwatli xre7t hjonli

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

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

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

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

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

which is antibacterial and antifungal[218, 238]. It inhibits the growth of *Staphylococcus aureus*, *E. coli*, streptococci, *Pneumococci* etc[176]. The plant also shows anti-tumour activity[218].

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

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

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

3.2.10 Populus hybrids

Hybrid poplar

2 tlin 10 cyuc 3 kcaak 4 tcan 3 dwat 50 m hkuc
hmimhtut cyutli kyuctup hwicli hrasjlutnyik hpa7tli frusflat-
prkhwissliphsom hpa7tmwatli hjonli

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

pcista See individual species.

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

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

system in which trees or shrubs are grown around or among crops or pastureland). Fodder: bank. Other Systems: SRC, irreg. intercrop, strip intercrop. Commonly grown as wind-breaks. Intercropped with annuals across northern China. In Italy they are pruned to be living trellises for grape growth.

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

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

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

3.2.11 Salix hybrids

Hybrid willows

2 tlin 11 cyuc 3 kcaak 5 tcan 3 dwat 25 m hkuc
htut cyutli tucphja7n hwicli hrasjlutnyik hpa7tli flatprkhwissliphsom hpa7tmwatli hjonli

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

pcista See individual species.

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

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

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

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

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

propta Seed

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

3.2.12 Betula pendula

Silver Birch, European white birch, Common Birch, Warty Birch, European White Birch

2 tlin 6 cyuc 3 kcaak 5 tcan 3 dwat 20 m hkuc
htut cyutli kyuctup hwicli hyshrasjlutnyikfrp hpa7tli frusflatprkhwissliphsom hpa7tmwatli hjonli

drutta Betula pendula is a deciduous Tree growing to 20 m (65ft) by 10 m (32ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 2. It is in flower in April, and the seeds ripen from July to August. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate strong winds but not maritime exposure.

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

kcakta Edible Parts: Flowers Inner bark Leaves SapEdible Uses: TeaInner bark - cooked or dried and ground into a meal[2, 15, 105]. It can be added as a thickener to soups etc or can be mixed with flour for making bread, biscuits etc. Inner bark is generally only seen as a famine food, used when other forms of starch are not available or are in short supply[115, 177, K]. Sap - raw or cooked. A sweet flavour. It is harvested in early spring, before the leaves unfurl, by tapping the trunk. It makes a pleasant drink[115]. It is often concentrated into a syrup by boiling off the water[2, 9, 13, 15, 177]. Between 4 and 7 litres can be drawn off a mature tree in a day and this will not kill the tree so long as the tap hole is filled up afterwards[115]. However, prolonged or heavy tapping will kill the tree[115]. The flow is best on sunny days following a frost. The sap can be fermented into a beer. An old English recipe for the beer is as follows: "To every Gallon of Birch-water put a quart of Honey, well stirr'd together; then boil it almost an hour with a few Cloves, and a little Limon-peel, keeping it well scumm'd. When it is sufficiently boil'd, and become cold, add to it three or four Spoonfuls of good Ale to make it work...and when the Test begins to settle, bottle it up . . . it is gentle, and very harmless in operation within the body, and exceedingly sharpens the Appetite, being drunk ante pastum."[269]. Young leaves - raw or cooked[15]. Young catkins[15]. No more details are

given. A tea is made from the leaves[15, 161] and another tea is made from the essential oil in the inner bark[21].

tcanta Adhesive Besom Charcoal Compost Dye Essential Fibre Fungicide Hair Miscellany Paper Pioneer Polish Repellent Tannin Thatching Waterproof WoodThe bark is used to make drinking vessels, canoe skins, roofing tiles etc[115]. It is waterproof, durable, tough and resinous. Only the outer bark is removed, this does not kill the tree. It is most easily removed in late spring to early summer. A pioneer species, it readily invades old fields, cleared or burnt-over land and creates conditions suitable for other woodland trees to become established. Since it is relatively short-lived and intolerant of shade, it is eventually out-competed by these trees[17, 186]. A tar-oil is obtained from the white bark in spring. It has fungicidal properties and is also used as an insect repellent[4, 13, 100]. It makes a good shoe polish[61]. Another report says that an essential oil is obtained from the bark and this, called 'Russian Leather' has been used as a perfume[245]. A decoction of the inner bark is used to preserve cordage[115], it contains up to 16% tannin[178, 223]. An oil similar to Wintergreen oil (obtained from *Gaultheria procumbens*) is obtained from the inner bark[21, 61]. It is used medicinally and also makes a refreshing tea[21]. The resin glands (the report does not say where these glands are found) are used to make a hair lotion[226]. A brown dye is obtained from the inner bark A glue is made from the sap[2, 9, 13, 15]. Cordage can be made from the fibres of the inner bark[115]. This inner bark can also be separated into thin layers and used as a substitute for oiled paper[4]. The young branches are very flexible and are used to make whisks, besoms etc[6]. They are also used in thatching[13, 100] and to make wattles[4]. The leaves are a good addition to the compost heap, improving fermentation[14]. Wood - soft, light, durable. It is used for a wide range of purposes including furniture, tool handles, toys and carving[13, 100, 238]. A high quality charcoal is obtained from the bark. It is used by artists, painters etc[13]. The wood is also pulped and used for making paper[238].

dwatta Anticholesterolemic Antiinflammatory Antirheumatic Antiseborrheic Antiseptic Astringent Bitter Cholagogue Diaphoretic Diuretic Eczema Laxative Lithontripic Miscellany Skin UrinaryAnti-inflammatory, cholagogue, diaphoretic[21, 165, 201]. The bark is diuretic and laxative[7]. An oil obtained from the inner bark is astringent and is used in the treatment of various skin afflictions, especially eczema and psoriasis[4, 238]. The bark is usually obtained from trees that have been felled for timber and can be distilled at any time of the year[238]. The inner bark is bitter and astringent, it is used in treating intermittent fevers[4]. The vernal sap is diuretic[4]. The buds are balsamic[7]. The young shoots and leaves secrete a resinous substance which has acid properties, when combined with alkalis it is a tonic laxative[4]. The leaves are anticholesterolemic and diuretic[7]. They also contain phytosides, which are effective germicides[7]. An infusion of the leaves is used in the treatment of gout, dropsy and rheumatism, and is recommended as a reliable solvent of kidney stones[4]. The young leaves and leaf buds are harvested in the spring and dried for later use[238]. A decoction of the leaves and bark is used for bathing skin eruptions[4]. Moxa is made from the yellow fungous excrescences of the wood, which sometimes swell out of the fissures[4]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve *Betula* species for infections of the urinary tract, kidney and bladder stones, rheumatism (see [302] for critics of commission E).

nrakta Most of Europe, including Britain, south and east to Morocco, W Siberia and central Asia. ksacta Open woodland and heaths[17, 100]. Rarely found on chalk[17].

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

drutta Rheum × hybridum is a deciduous Perennial growing to 1.5 m (5ft) by 1.5 m (5ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. The flowers are pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. It cannot tolerate atmospheric pollution.

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

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

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

dwatta Rhubarb has a long and proven history of herbal usage, its main effect being a positive and balancing effect upon the whole digestive system. It is one of the most widely used herbs in Chinese medicine[238]. The main species used is *R. palmatum*. Though the chemistry varies slightly, this species is used interchangeably[238]. Another report says that this species contains only small quantities of the medicinally active compounds and so it is only used as a mild laxative[244]. The root is taken internally in the treatment of chronic constipation, diarrhoea, liver and gall bladder complaints, haemorrhoids, menstrual problems and skin eruptions due to an accumulation of toxins[238]. This remedy is not prescribed for pregnant or lactating women, nor for patients with intestinal obstruction[238]. Externally, the root is used in the treatment of burns[238]. The roots are harvested in October from plants that are at least six years old, they are then dried for later use[4]. A homeopathic remedy is prepared from the dried root[232]. This is used especially in the treatment of diarrhoea in teething children[232].

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

nwatta *R. hybridum* is an herbaceous perennial plant. A very easily grown plant, tolerant of considerable neglect, it prefers a deep, fertile, moderately heavy, humus rich, moisture retentive, well-drained soil in sun or semi-shade[200, 264]. It succeeds in most soils provided the drainage is good[200] and will grow in the dappled shade of trees so long as there is sufficient side light[K]. It grows well in heavy clay soils. Tolerates acid conditions but prefers a pH in the

range 6.5 to 7[200]. Plants are very cold hardy, tolerating temperatures down to at least -20°C[200]. The plant does not like hot summers, however, and is likely to die in warmer climates[264]. Rhubarb is a long-lived and almost indestructible perennial plant[264]. It is often cultivated for its edible leaf stems, there are many named varieties[74, 183]. Most cultivars produce edible stems from spring to early summer, though 'Glaskin's Perpetual' can be harvested throughout the summer. By digging up the roots in the autumn and exposing them to frost, earlier growth will be initiated. These roots can then be transferred to a cold frame or other protected area where they will produce their edible stems in late winter. It is also possible to produce earlier crops outdoors by covering the plants with a layer of straw and an upturned bucket. This species is probably of hybrid origin, *R. rhaponticum* × *R. palmatum*[200]. It hybridizes freely with other members of the genus[200]. Plants in this genus seem to be immune to the predations of rabbits[233]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2].

4.2.41 *Secale cereale*

Rye, Cereal rye

3 tin 7 cyuc 4 kcak 3 tcan 1 dwat 1.8 m hkuc htut cyutli hgattcup hwicli hrasjlutnyik hpa7tli flatprikkwis hpa7tmwatli xre7t hjonli

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

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

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

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

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

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

nwatta An easily grown plant, it succeeds in most soils but prefers a well-drained light soil in a sunny position[1, 132]. It thrives on infertile, submarginal areas and is renowned for its ability to grow on sandy soils[269]. Established plants are drought tolerant[1]. The plant is reported to tolerate an annual precipitation in the range of 22 to

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

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

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

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

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

4.1.7 *Gymnocladus dioica*

Kentucky Coffee Tree

tf0zn 3 tin 8 cyuc 3 kcak 0 tcan 2 dwat 20 m hkuc htut cyutli hgattcup hwicli hysihrasjlutnyik hpa7tli flatprikkwis hpa7tmwatli nyanhjen hjonli

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

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

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

tcanta Insecticide Miscellany Soap Soil reclamation WoodThe fruit is high in saponins and is used as a soap[200]. The leaves are used as a fly poison[222]. Trees are planted on the spoil tips of mines to stabilize and reclaim the soil[200]. Wood - coarse-grained, heavy though not hard, strong, very

durable in contact with the soil, finishes to a fine lustre. A handsome wood, it weighs 43lb per cubic foot and is used for cabinet work, furniture, construction, fencing etc[46, 61, 82, 171, 229, 235].

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

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

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

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

4.1.8 *Shepherdia argentea*

Buffalo Berry, Silver Buffaloberry, tf0zn 3 tin 9 cyuc 3 kcak 4 tcan 1 dwat 4 m hkuc hmitmtut cyutli hgattcup hwicli hysihrasjlutnyik hpa7tli flatprikkwis hpa7tmwatli nyanhjen hjonli

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

pcista The fruit contains low concentrations of saponins[101]. Although toxic, these substances are very poorly absorbed by the body and so tend to pass through without causing harm. They are also broken down by thorough cooking. Saponins are found in many plants, including several that are often used for food, such as certain beans. It is advisable not to eat large quantities of food that contain saponins. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K].

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

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

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

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

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

nwatta Landscape Uses:Erosion control, Massing. Succeeds in an ordinary well-drained moisture retentive soil[1, 3, 11]. Tolerates poor dry soils[200] and maritime exposure[182]. Established plants are drought resistant[182]. A very cold-tolerant plant[229]. Plants rarely produce fruit in Britain[11]. Occasionally cultivated for its edible fruit, there are some named varieties[183]. 'Xanthocarpa' has yellow fruits[200]. The fruit is difficult to harvest because the shrub is very thorny[3]. Plants in this genus are notably resistant to honey fungus[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. Dioecious. Male and female plants must be grown if fruit and seed are required.

Special Features:Attractive foliage, North American native, Inconspicuous flowers or blooms. The plant is heat tolerant in zones 6 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.)

4.1.9 Lathyrus japonicus maritimus

Beach Pea

tfo2n 3 tlin 7 cyuc 2 kcak 3 tcan 0 dwat m hkuc

htut cyuti kyuctup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

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

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

kcakta Edible Parts: Leaves Seed SeedpodEdible Uses: CoffeeThe immature seeds are eaten raw or cooked like

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

tcanta Nitrogen Fixer.

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

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

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

4.1.10 Lathyrus japonicus

Beach Pea, Smallflower beach pea

tfo2n 3 tlin 7 cyuc 2 kcak 0 tcan 0 dwat 0.6 m hkuc

htut cyuti kyuctup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

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

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

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

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

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

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

nwatta Thrives in a well-drained moisture-retentive loamy soil, doing well on limestone[11, 200]. Prefers some lime in the soil but is likely to become chlorotic if too much lime is present[1]. Requires a sunny position[11]. Tolerates maritime exposure[11, 102]. The beach plum is cultivated for its edible fruit in N. America, there are some named varieties[183]. The fruit is often sold in local markets[46] and the plant is of potential commercial importance[171]. The fruit seldom ripens when grown in the interior of America[2]. The cultivar 'Eastham' has large well-flavoured fruit and is a heavy cropper[200]. 'Hancock' is an early ripening form with sweet juicy fruit[200]. 'Squibnocket' is of high quality and is also a good sand binder[200]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. Plants in this genus are notably susceptible to honey fungus[200]. The plant is heat tolerant in zones 6 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A clumping plant, forming a colony from shoots away from the crown but with a limited spread [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

4.2.39 Rhus aromatica

Lemon Sumach, Fragrant sumac

3 tlin 9 cyuc 4 kcak 2 tcan 2 dwat 1.2 m hkuc

htut cyuti hgakkyuctup hwicli hyishrasljutnyik hpa7tli flatprikliwis hpa7tmwatli nyanhjen hjonli

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

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

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

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

dwatta Astringent Diuretic DysenteryThe leaves are astringent and diuretic[61, 222]. They were used in the treatment of colds, stomach aches and bleeding[222]. The root bark is astringent and diuretic[4, 222]. An infusion can be used in the treatment of diarrhoea, dysentery. Used externally, it is used to treat excessive vaginal discharge and skin

eruptions and also as a gargle for sore throats[254]. Its use is contraindicated if inflammation is present[222]. The root is harvested in the autumn and dried for later use[254]. The fruits are astringent and diuretic[254]. They have been chewed in the treatment of stomach aches, toothaches and gripe[222] and used as a gargle to treat mouth and throat complaints[254]. They help reduce fevers and may be of help in treating late-onset diabetes[254]. Some caution is advised in the use of the leaves and stems of this plant, see the notes above on toxicity.

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

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

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

4.2.40 Rheum × hybridum

Garden Rhubarb

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

hmimhtut cyuti tcup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli hjonli

last expected frosts. Germination is usually rapid and good if the soil is warm[133]. A drop in temperature overnight aids germination[133]. Cuttings of growing plants root easily[206].

nwatta Prefers a well-drained fertile soil in a sunny position[200]. Requires a hot sheltered position if it is to do well[K]. Tolerates a pH in the range 5.2 to 7.5. Plants should not be given inorganic fertilizers, see notes above on toxicity. Often cultivated, especially in tropical areas, for its edible leaves and seeds, there are many named varieties[183]. This is the most robust and highest yielding of the grain amarantths, though it is late maturing and therefore less suitable for northern areas[183]. Most if not all members of this genus photosynthesize by a more efficient method than most plants. Called the 'C4 carbon-fixation pathway', this process is particularly efficient at high temperatures, in bright sunlight and under dry conditions[196]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is clumping, giving the plant a clumping habit. The predictable growth behaviour makes it easier to maintain without having to apply containment methods[2-1].

4.2.37 *Camassia leichtlinii*

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

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

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

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

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

nwatta A very easily grown plant, it succeeds in almost any soil[42] and is tolerant of considerable neglect once it is established[K]. Grows well in heavy clay soils. Prefers a rather heavy loam[1] that has plenty of moisture in spring but does not remain wet over the winter[138, 200]. Dislikes dry soils[200]. Prefers full sun but tolerates partial shade[138, 200]. A very ornamental plant[1], there are many named varieties[200]. Plants often self-sow[K]. A good bee plant[108]. Plants can be naturalized in damp grass, this should not be

trimmed until mid to late summer when the bulbs have flowered and the leaves have died down[134]. This species can be confused with certain poisonous bulbs in the genus *Zigadenus*[85]. Plant the bulbs 7 - 10cm deep in early autumn and then leave undisturbed[1]. The bulbs should be planted about 20cm deep[233]. The plant is heat tolerant in zones 12 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. Ephemeral emerging in spring and dying back by summer every year [1-2]. The root pattern is a bulb.

4.2.38 *Prunus maritima*

Beach Plum, Graves' plum

3 tlin 7 cyuc 4 kcaak 3 tcan 1 dwat m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta *Prunus maritima* is a deciduous Shrub growing to 2.5 m (8ft 2in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: Fruit SeedEdible Uses: Fruit - raw or cooked[2, 55, 102]. Very variable in quality[11], the best forms are sub-acid to sweet, the fruit can be eaten out of hand, used in pies, preserves etc or be dried for later use[46, 171, 183]. The fruit is about 15mm in diameter and contains one large seed[200]. Seed - raw or cooked. Do not eat the seed if it is too bitter - see the notes above on toxicity.

tcanta Dye Soil stabilizationA green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168]. Plants have extensive root systems and can be used for binding sand along the coast[200].

dwatta Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta Eastern N. America - New Brunswick to Virginia. ksacta Light gravelly or sandy soils near the coast[43, 182].

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200]. Softwood cuttings from strongly growing plants in spring to early summer in a frame[200]. Layering in spring.

4.1.11 *Hedysarum vicioides*

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

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

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

nrakta E. Asia - N. Korea to E. Siberia. ksacta Sandy to gravelly slopes in high mountains or grassy places in lower districts of Japan[58]. River banks in E. Siberia[74]. Forests and subalpine meadows at elevations of 2500 - 3200 metres[266].

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

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

4.1.12 *Trifolium incarnatum*

Crimson Clover

tfo2n 3 tlin 9 cyuc 2 kcaak 4 tcan 0 dwat 0.5 m hkuc htut cyutli tcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyixre7t hjonli

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

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

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

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

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

nwatta Succeeds in a moist, well-drained circum-neutral soil in full sun[200]. Succeeds in poor soils. The ssp. *molin-erli* is the form of this species that is native to Britain, whilst ssp. *incarnatum* is naturalized in S. Britain and is the form grown as a green manure crop[17]. It grows well in an apple orchard, the trees will produce tastier fruit that stores better[201]. It should not be grown with camellias or gooseberries because it harbours a mite that can cause fruit drop in the gooseberries and premature budding in the camellias[201]. Fairly resistant to 'clover rot'[87]. This species has a symbiotic relationship with certain soil bacteria, these

bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. Buttercup growing nearby depress the growth of the nitrogen bacteria by means of a root exudate[201]. When removing plant remains at the end of the growing season, it is best to only remove the aerial parts of the plant, leaving the roots in the ground to decay and release their nitrogen.

4.1.13 *Lathyrus ornatus*

Bush Vetchling

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

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

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

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

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

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

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

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

4.1.14 *Dryas octopetala*

Mountain Avens, Eightpetal mountain-avens, Alaskan mountain-avens, Hooker's mountain-avens, Kamtsch tfo2n 3 tlin 6 cyuc 1 kcaak 2 tcan 1 dwat 0.1 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta *Dryas octopetala* is an evergreen Shrub growing to 0.1 m (0ft 4in) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 2. It is in leaf all year, in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Edible Uses: TeaThe leaves are used as a tea substitute[2, 13, 46, 183].

tcanta The plant makes a good ground cover for spring bulbs, though it is not strongly weed suppressive[200]. Slow-growing at first, it then forms a dense mat[197]. Plants should be spaced about 30cm apart each way and they form a carpet, the branches rooting at intervals along the stems[208].

dwatta Antidiarrhoeal Astringent DigestiveThe entire plant, harvested just before or at flowering time is astringent and digestive[9]. An infusion is used as a stomach tonic, and also as a gargle for treating gingivitis and other disorders of the mouth and throat[9].

nrakta Arctic and sub-arctic Europe, Asia and America. Mountains in south Europe, including Britain. ksacta Rocky places and high pastures[13], especially on limestone rocks[1].

propta Seed - best sown in pots a shady cold frame or sheltered place outdoors as soon as it is ripe[200]. Stored seed requires stratification and should be sown as soon as possible. The seed usually germinates in 1 - 12 months or more at 20°C[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division of self-layered shoots in early spring[1, 200]. Cuttings of half-ripe wood with a heel, July/August in sharp sand in a frame[1, 200].

nwatta Landscape Uses:Alpine garden, Ground cover, Rock garden. Easily grown in ordinary gardening soil[1, 11], preferring a sunny position[4]. Prefers limestone soils[1]. Prefers a gritty well-drained peaty soil[188]. A sub-shrub, producing annual stems from a woody base[11, 200]. A good plant for a rock garden[1], it succeeds on banks and on walls[188]. A very ornamental plant[1]. The sub-species *D. octopetala hookeriana* has been shown to produce nitrogen nodules on its roots due to a symbiotic relationship with certain soil bacteria, in the same way as peas and beans[212]. It has been assumed here that the species type can also do this[K]. Some of the nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. Established plants strongly resent root disturbance[200]. Special Features:Attractive foliage, Not North American native. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. An evergreen. A clumping mat former. Forming a dense prostrate carpet with a limited spread [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2].

4.1.15 Lotus corniculatus

Bird's Foot Trefoil

tf02n 3 tlin 8 cyuc 1 kcaak 4 tcan 1 dwat 0.3 m hkuc htut cyutli kyucptcup hwicli hyhsrsljtnyik hpa7tli flatprikwis hpa7tmwatli fyifxre7t hjonli

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

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

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

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

dwatta Antinflammatory Antispasmodic Cardiotonic Carminative Febrifuge Hypoglycaemic Restorative Seda-

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

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

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

nwatta Landscape Uses:Border, Erosion control, Rock garden. Requires a well-drained soil in a sunny position[200]. Dislikes shade[200]. Does well on poor soils[61]. An important food plant for many caterpillars[30]. It is also a good bee plant[74], the flowers providing an important source of nectar[240]. The flowers are powerfully scented, even though they are able to pollinate themselves[245]. The plant spreads very freely at the roots[1]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. Special Features:Attracts butterflies. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is suckering with new plants from runners away from the plant [2-1].

4.1.16 Alnus glutinosa

Alder, European alder , Common Alder, Black Alder

tf02n 3 tlin 7 cyuc 0 kcaak 5 tcan 3 dwat 25 m hkuc hmimhtut cyutli tcuphja7n hwicli hyslajtnyikfrp hpa7tli flatprikwis hpa7tmwatli hjonli

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

tcanta Charcoal Dye Hedge Hedge Ink Insecticide Parasticide Pioneer Shelterbelt Soil reclamation Tannin Teeth WoodTolerant of clipping and maritime exposure, the alder can be grown in a windbreak or a hedge[75]. The trees are very quick to establish[200] and will grow at a rate of 1 metre or more per year when young[K]. This is an excellent pioneer species for re-establishing woodlands on disused farmland, difficult sites etc. Its fast rate of growth means that it quickly provides sheltered conditions to allow more permanent woodland trees to become established. In addition, bacteria on the roots fix atmospheric nitrogen - whilst this enables the tree to grow well in quite poor soils it also makes some of this nitrogen available to other plants growing nearby. Alder trees also have a heavy leaf canopy and when the leaves fall in the autumn they help to build up the humus content of the soil. Alder seedlings do not compete well in shady woodland conditions and so this species gradually dies out as the other trees become established[K]. Because they tolerate very poor soils and also produce nitrogen nodules on their roots, alders are suitable for use in land reclamation schemes. The plants can be used as a source of biomass[269]. According to the phytomass files, annual productivity is estimated at 6 to 9 tonnes per hectare. The tree has yielded 11.8 tonnes per hectare per annum on pulverized fuel ash and annual productivity has been estimated at 8.66 tonnes per hectare, with 5.87 tonnes in wood, bark, and branches, 2.79 tonnes in foliage[269]. Alder has been

tcanta Dye RootstockA green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168]. The plant can be used as a rootstock for plums[160]. It produces mostly dwarf trees that are poorly anchored[183]. Prone to severe suckering[183]. Compatible with most prunes, it is incompatible with damsons and Victoria plums[183]. Resistant to 'Crown Gall'[183]. Trees on this rootstock are productive and very cold hardy[183]. Cuttings are often easy to root but seedlings vary widely[183].

dwatta Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta Central N. America - Manitoba and Minnesota to Kansas and Utah. ksacta Sandy hills, open plains, rocky slopes or shores[43].

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200]. Softwood cuttings from strongly growing plants in spring to early summer in a frame[200]. Division of suckers in the dormant season. They can be planted out direct into their permanent positions. Layering in spring.

nwatta Landscape Uses:Specimen. Thrives in a well-drained moisture-retentive loamy soil, doing well on limestone[11, 200]. Prefers some lime in the soil but is likely to become chlorotic if too much lime is present[1]. Succeeds in sun or partial shade though it fruits better in a sunny position[11, 200]. Established plants are drought resistant[160]. A very hardy plant, probably tolerating temperatures down to about -50°C when it is fully dormant[160]. It is cultivated for its edible fruit in warmer climates than Britain[11], there are some named varieties[183]. It flowers very well in this country but does not usually produce much fruit[11]. Another report says that it sometimes fruits abundantly in Britain. The cultivar 'Black Beauty' crops well and has small black sweet fruits[200]. 'Hansens' has large fruits with a good flavour[200]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. Plants are inclined to sucker and can produce dense thickets[160]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features:Attracts birds, North American native, All or parts of this plant are poisonous, Fragrant flowers, Blooms are very showy.

4.2.35 Helianthus pauciflorus

Stiff Sunflower, Prairie Sunflower

3 tlin 7 cyuc 4 kcaak 1 tcan 0 dwat 1.5 m hkuc htut cyutli hgatkyuctcup hwicli hrasljtnyik hpa7tli flatprikwis hpa7tmwatli hjonli

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

kcakta Edible Parts: Oil SeedEdible Uses: OilCarbon Farming Solutions - Staple Crop: protein-oil (The term staple crop typically refers to a food that is eaten routinely and accounts for a dominant part of people's diets in a particular region of the world) [1-1]. Perennial crops are being developed for their oil-seed. The Land Institute see them as part of a perennial polyculture system [1-1].

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

nrakta North American. Widespread across the Great Plains, the Rocky Mountains, and the Great Lakes region. Naturalized in the eastern United States and in much of southern Canada (from Alberta to Nova Scotia). ksacta Dry

to moderately wet prairies and open areas. Subspecies *Helianthus pauciflorus* subsp. *subrhomboideus* occurs in dry, open habitats.

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

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

4.2.36 Amaranthus hypochondriacus

Prince's Feather, Prince-of-wales feather

3 tlin 10 cyuc 4 kcaak 2 tcan 3 dwat 1.2 m hkuc htut cyutli tcup hwicli hrasljtnyik hpa7tli flatprikwis hpa7tmwatli fyif hjonli

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

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

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

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

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

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

propta Seed - sow late spring in situ. An earlier sowing can be made in a greenhouse and the plants put out after the

excellent addition to salads at this time of year[K]. A nutritional analysis of the leaves is available[218]. Flowers - raw[52]. An attractive addition to the salad bowl[183], but rather bitter[K]. Root - cooked like parsnip[5, 7, 9, 13, 21, 27, 46]. The boiled young roots form a very palatable vegetable[4]. The root is said to be an ideal food for diabetics because of its inulin content[9]. Inulin is a starch that cannot be digested by humans, it tends to pass straight through the digestive system and is therefore unlikely to be of use to a diabetic[K]. However, the inulin can be used to make a sweetener that is suitable for diabetics to use[K]. Chicory-root is free of harmful ingredients, and is essentially a concentrated combination of three sugars (pentose, levulose and dextrose) along with taraxaric (the bitter principle of dandelion)[269]. It is especially important as source of levulose[269]. Roots are used in seasoning soups, sauces and gravies, and to impart a rich deep colour[269]. The roasted root is used as a caffeine-free coffee adulterant or substitute[2, 4, 5, 7, 13, 21, 27, 46]. Young roots have a slightly bitter caramel flavour when roasted, roots over 2 years old are much more bitter[238].

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

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

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

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

nwatta Prefers a sunny position in a moderately fertile well-drained moisture retentive soil[1, 14, 52]. Prefers a pH 5.5 to 7[200]. Tolerates a pH in the range 4.5 to 8.3. Chicory grows on any type of soil but, when cultivated, grows best on mellow, deeply tilled, fertile soil or sandy loam[269]. A cool weather crop, it tolerates only moderate summer temperatures and requires well-distributed rainfall, with good drainage, or some irrigation in drier areas[269]. Chicory roots deeply in relatively short time; soil too wet for beans and small grains is not suitable[269]. To insure proper root-growth, apply lime or marl to acid soil to neutralize acidity[269]. Chicory is reported to tolerate a pH in the range of 4.5 to 8.3, an annual rainfall of 30 to 400 cm and an annual mean biotemperature of 6° to 27°C[269]. Chicory is an excellent winter salad. It is often cultivated, especially in Europe, for its edible leaves and for its roots which are used to make a coffee substitute. There are many named vari-

eties[46, 132, 183] and, by careful selection of cultivars and sowing times, fresh leaves can be obtained all year round. There are three main types of chicory grown for their leaves, there are many cultivars of each form: A bitter-tasting loose-leaved form is grown as a green winter vegetable, especially in southern Italy. A narrow-leaved, wilfoo or Belgian form has a compact elongate head (chicon) which is blanched for use in salads or cooked dishes. A broad-leaved (usually red) form produces cabbage-like hearts, these are generally less bitter than the other forms and are eaten raw or cooked. These forms are often used as a winter salad crop[K]. Although a perennial, chicory is usually cultivated as an annual crop, especially when being grown as a winter salad. The winter salad cultivars are usually sown in early summer to make sure that they do not flower in their first year of growth. By late autumn they have formed an overwintering rosette of leaves rather like a cabbage. These leaves can be harvested as required during the winter and the plants will then usually make some new growth (as long as the winter is not too cold) that can be harvested in late winter or early spring. The plants run to flower in the following summer and fail to make an overwintering rosette of leaves for that winter[K]. Chicory can be grown successfully in a meadow or even in a lawn so long as the grass is not cut too short nor too often[K]. It often self-sows freely when well-sited, especially if it is growing in a dry alkaline soil[238]. A good bee plant[24, 108]. A very ornamental plant[1]. The flowers open in the early morning (about 6 - 7 o'clock in Britain) and close around midday[4]. Special Features: Edible, Not North American native, Invasive, Naturalizing. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

4.2.34 Prunus besseyi

Western Sand Cherry

3 tlin 6 cyuc 4 kcaak 2 tcan 1 dwat 1.2 m hkuc hmimhtut cyuti hqtaccup hwicli hrasjlyutnyk hpa7tli flatprik-lwis hpa7tmwatli xre7t hjonli

drutta Prunus besseyi is a deciduous Shrub growing to 1.2 m (4ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought.

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcaakta Edible Parts: Fruit SeedEdible Uses: Fruit - raw or cooked[85, 183, 257]. A sweetish flavour, the fruit can also be dried for later use[183]. It makes a rather astringent but tasty jelly[182].The fruit is a reasonable size, up to 18mm in diameter, and contains one large seed[200]. Seed - raw or cooked. Do not eat the seed if it is too bitter - see the notes above on toxicity.

recommended for consideration for firewood plantations in Tropical highlands where unseasonable cold might destroy the red alder[269]. The powdered bark has been used as an ingredient of toothpastes[9]. Sticks of the bark have been chewed as tooth cleaners[9]. An ink and a tawny-red dye are obtained from the bark[4, 6, 7, 66]. A green dye is obtained from the catkins[4, 6, 66]. A pinkish-fawn dye is obtained from the fresh green wood[4, 6, 66]. A yellow dye is obtained from the bark and young shoots[4, 6, 66]. A cinamon dye is obtained from the shoots if they are harvested in March[4]. If they are dried and powdered then the colour will be a tawny shade[4]. The bark and the fruits contain up to 20% tannin[46, 61, 223], but they also contain so much dyestuff (imparting a dark red shade) that this limits their usefulness[4, 7]. The leaves are also a good source of tannin[4]. The leaves are clammy and, if spread in a room, are said to catch fleas and flies on their glutinous surface[4, 7]. Wood - very durable in water, elastic, soft, fairly light, easily worked, easily split. It is often used for situations where it has to remain underwater and is also used for furniture, pencils, bowls, woodcuts, clogs etc. It is much valued by cabinet makers[4, 7, 11, 13, 26, 46, 66, 100, 115]. The wood also makes a good charcoal[4, 115].

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

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

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

nwatta Agroforestry Services: Nitrogen Industrial Crop: Biomass Industrial Crop: Tannin Management: Copice Management: Standard Minor Global Crop Other Systems: SRLandscape Uses:Firewood, Pest tolerant, Pollard, Screen. Prefers a heavy soil and a damp situation[1, 11], tolerating prolonged submergence of its roots and periods with standing water to 30cm deep[186, 200]. Plants can also grow quickly in much drier sites, though they will usually not live for so long in such a position. Alders grow well in heavy clay soils[24, 98], they also tolerate lime and very infertile sites[200]. Tolerates a wide range of soils but prefers a

pH above 6[186]. Very tolerant of maritime exposure[49, 75, 166]. Alder is estimated to tolerate an annual precipitation of 40 to 200cm, an annual average temperature of 8 to 14°C and a pH of 6 to 8[269]. The leaves often remain green on the tree until November, or even later on young seedlings. The seeds contain a margin of air-filled tissue and are capable of floating in water for 30 days before becoming waterlogged[186]. This enables distribution of the seed by water. The alder has a very rapid early growth[98], specimens 5 years old from seed were 4 metres tall even though growing in a very windy site in Cornwall[K]. This species has a symbiotic relationship with certain soil micro-organisms, these form nodules on the roots of the plants and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[98, 200]. Nitrogen-fixation by trees up to 8 years old has been put at 125 kg/ha/yr., for 20 years at 56 - 130 kg/ha/yr.[269]. Trees often produce adventitious roots from near the base of the stem and these give additional support in unstable soils[186]. Trees are very tolerant of cutting and were at one time much coppiced for their wood which had a variety of uses[4, 186]. Alders are an important food plant for the caterpillars of many butterfly and moth species[30] and also for small birds in winter[24]. There are 90 insect species associated with this tree[24]. There are some named varieties, selected for their ornamental value[200]. Special Features: Not North American native, Naturalizing, Wetlands Plant, Inconspicuous flowers or blooms. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

4.1.17 Alnus hirsuta

tfo2n 3 tlin 7 cyuc 0 kcaak 0 tcan 0 dwat 18 m hkuc hmimhtut cyuti tcuphja7n hwicli hysjlyutnykrip hpa7tli flatprik-lwis hpa7tmwatli hjonli

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

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

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

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

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

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

4.1.18 Robinia viscosa

Clammy Locust, Hartweg's locust
tfo2n 3 tlin 7 cyuc 0 kcaak 3 tcan 0 dwat 13 m hkuc
hmimhtut cyutli hgatkyuctup hwicli vyhysras]lutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

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

tcanta Soil stabilizationPlants produce an extensive suckering root system and can be used for soil stabilization on banks etc[229]. The flowers are a rich source of nectar for bees. Wood - heavy, hard, close-grained[82]. The wood weighs 50lb per cubic foot[235].

nrakta South-eastern N. America - Pennsylvania to Alabama. ksacta Dry open woodland and hillside scrub to 1200 metres[184].

propta Seed - pre-soak for 48 hours in warm water and sow the seed in late winter in a cold frame[80]. A short stratification improves germination rates and time[80]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in the following summer. The seed stores for over 10 years[113]. Suckers taken during the dormant season.

nwatta Succeeds in any soil, preferring one that is not too rich[1, 200]. Requires a well-drained soil, succeeding on dry barren sites[184, 200]. Plants are tolerant of drought and atmospheric pollution[200]. Plants prefer a position in full sun, though they also tolerate light shade. A very hardy plant, tolerating temperatures down to at least -25°C when fully dormant[184]. A fast-growing but short-lived species in the wild[229]. The branches are brittle and very liable to wind damage[200]. When plants are grown in rich soils they produce coarse and rank growth which is even more liable to wind damage[11, 200]. Any pruning should be done in late summer in order to reduce the risk of bleeding[200]. The young branches, seedpods and petioles are covered with dark glandular hairs that exude a clammy sticky substance[82]. Plants sucker freely, especially after coppicing, the suckers have vicious thorns. A very greedy tree, tending to impoverish the soil. Plants in this genus are notably resistant to honey fungus[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a running thicket former forming a colony from shoots away from the crown spreading indefinitely [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

4.1.19 Alnus serrulata

Smooth Alder, Hazel alder
tfo2n 3 tlin 9 cyuc 0 kcaak 2 tcan 2 dwat 4.5 m hkuc
htut cyutli tucphja7n hwicli vyhys]lutnyikfrip hpa7tli flatprikliwis hpa7tmwatli hjonli

drutta Alnus serrulata is a deciduous Shrub growing to 4.5 m (14ft 9in). See above for USDA hardiness. It is hardy to UK zone 3. The species is monoecious (individual flowers are either male or female, but both sexes can be found on

the same plant) and is pollinated by Wind. It can fix Nitrogen. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist or wet soil.

tcanta Soil stabilizationTrees have extensive root systems and are sometimes planted on the banks of streams in order to prevent erosion[227]. The wood is soft and brittle, weighing 29lb per cubic foot[227]. It is of little commercial value[229].

dwatta Astringent Diuretic Emetic Ophthalmic PurgativeA tea made from the bark is analgesic, astringent, blood purifier, diuretic, emetic and purgative[4, 222, 257]. It is used in the treatment of diarrhoea, the pain of childbirth, coughs, toothache and sore mouths[222]. Externally, it is used as an eye wash and a wash for hives, poison ivy rash, piles, swellings and sprains[222]. A decoction of the cones is astringent[4].

nrakta Eastern N. America - Maine to Florida, west to Oklahoma and Indiana. ksacta Moist lowlands, such as swamps, and along ponds and streams where it forms thickets[222, 229].

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

nwatta Prefers a heavy soil and a damp situation[1, 11]. Grows well in heavy clay soils[11]. Tolerates very infertile sites[200]. Requires a position in full sun, dying out when shaded by taller trees[229]. A fast-growing but short-lived tree[229]. This species is closely related to A. rugosa[11]. This species has a symbiotic relationship with certain soil micro-organisms, these form nodules on the roots of the plants and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

4.1.20 Alnus maritima

Seaside Alder, Beach Alder
tfo2n 3 tlin 7 cyuc 0 kcaak 0 tcan 0 dwat m hkuc
htut cyutli tucphja7n hwicli vyhys]lutnyikfrip hpa7tli flatprikliwishsom hpa7tmwatli hjonli

drutta Alnus maritima is a deciduous Tree growing to 9 m (29ft 6in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from September to October, and the seeds ripen in May. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. It can fix Nitrogen. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in saline soils. It cannot grow in the shade. It prefers moist or wet soil.

tcanta Biomass WoodThis species has the potential to be used as a biomass crop[269]. Wood - light, soft, close-

from the crown into several primary roots going down and out [2-1].

4.2.32 Rheum x cultorum

Rhubarb
3 tlin 7 cyuc 4 kcaak 2 tcan 3 dwat 1.5 m hkuc
hmimhtut cyutli tucp hwicli lutnyikfrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

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

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

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

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

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

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

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

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

4.2.33 Cichorium intybus

Chicory, Radicchio, Succory, Witloof
3 tlin 7 cyuc 4 kcaak 3 tcan 3 dwat 1.5 m hkuc
htut cyutli tucp hwicli hras]lutnyik hpa7tli frusflatprikliwislip hpa7tmwatli fyfkr7t hjonli

drutta Cichorium intybus is a PERENNIAL growing to 1.5 m (5ft) by 0.5 m (1ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from July to October, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It cannot grow in the shade. It prefers moist soil.

pcista Excessive and continued use may impair function of the retina[268]. Slight potential for sensitization [301]

kcakta Edible Parts: Flowers Leaves RootEdible Uses: CoffeeLeaves - raw or cooked[2, 4, 5, 9, 27, 33, 171]. The leaves are rather bitter, especially when the plants are flowering[4]. The leaves are often blanched by excluding light, either by removing all the leaves and then earthing up the new growth, or by covering the plant with a bucket or something similar. Whilst this greatly reduces any bitterness, there is also a corresponding loss of vitamins and minerals[K]. The blanched leaves are often used in winter salads (they are known as chicons) and are also cooked[132, 200]. The unblanched leaves are much less bitter in winter and make an

and Rheum palmatum[254]. The plant is antibacterial, antifungal, carminative[9, 21, 147, 165, 176]. It has soothing, mucilaginous properties and is said to be one of the most certain cures for many types of skin diseases, burns, bruises etc[4, 244]. It is used in the treatment of herpes, eczema, acne, impetigo, ringworm, boils, bites etc[244]. The plant can be taken internally as an infusion, or used externally as a wash[244]. Use with caution[165]. The roots of one-year old plants are harvested in mid-summer and dried. They are alternative, aperient, blood purifier, cholagogue, depurative, diaphoretic, diuretic and stomachic[218, 222]. The seed is alternative, antiphlogistic, depurative, diaphoretic and diuretic[218]. Recent research has shown that seed extracts lower blood sugar levels[238]. The seed is harvested in the summer and dried for later use[254]. The crushed seed is poulticed onto bruises[222]. The leaves are poulticed onto burns, ulcers and sores[222].

nrakta Most of Europe, including Britain, east to northern Asia. ksacta Waste ground, preferring calcareous soils[7], it is sometimes also found in meadows and woods[9].

propta Seed - best sown in situ in the autumn[200]. The seed can also be sown in spring[206]. Germination can be erratic, it is best to sow the seed in trays and plant out the young plants before the tap-root develops[206]. Seed requires a minimum temperature of 10°C, but a temperature of 20 - 25°C is optimum[206]. Germination rates can be improved by pre-soaking the seed for 12 hours or by scarification[206]. They germinate best in the light[206]. The autumn sowing should be made as late as possible because any plants with roots more than 3mm in diameter in the spring will quickly run to seed if cold temperatures are followed by daylengths longer than 12½ hours[206].

nwatta Succeeds in most soils when grown in partial shade[200]. Prefers a moist neutral to alkaline soil[238] and a sunny position in a heavy soil[22]. Plants are best grown in a light well-drained soil if the roots are required for culinary use[200, 206]. Tolerates a pH in the range 4.6 to 7.8. The top growth dies back at temperatures a little above freezing, but the roots tolerate much lower temperatures[206] and can be left in the ground all winter to be harvested as required. Burdock is cultivated for its edible root in Japan, there are some named varieties[183]. Spring-sown seed produces edible roots in late summer and autumn, whilst autumn sown crops mature in the following spring or early summer[206]. Although the plants are quite large, it is best to grow them fairly close together (about 15cm apart, or in rows 30cm apart with the plants 5 - 8cm apart in the rows) since this encourages the development of long straight roots[206]. The seed head has little hooked prickles and these attach themselves to the hairs or clothing of passing creatures and can thus be carried for some considerable distance from the parent plant[4]. The plants usually self-sow freely[238]. The flowers are very attractive to bees and butterflies[206]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fleshy. Thick or swollen - fibrous or tap root [2-1].

4.2.30 Rubus canadensis

American Dewberry, Smooth blackberry
3 tlin 7 cyuc 4 kcaak 1 tcan 1 dwat 2.5 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprkikwis hpa7tmwatli xre7t hjonli

drutta Rubus canadensis is a deciduous Shrub growing to 2.5 m (8ft 2in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Apomictic (reproduce by seeds formed without sexual fusion). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked in pies, jams etc[2, 3, 43, 105, 183]. Sweet, juicy and richly flavoured, it is generally preferred to most other species of blackberries[2, 183]. The fruit can be pressed into cakes and then dried for later use[257]. The fruit can be up to 25mm long[235].

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

dwatta Astringent DysenteryThe stems and the fruit have been used in the treatment of dysentery[257]. A decoction of the root has been used in the treatment of dysentery[257].

nrakta North-eastern N. America - Newfoundland to Michigan and North Carolina. ksacta Thickets, woods and clearings[43, 235].

propta Seed - requires stratification and is best sown in early autumn in a cold frame. Stored seed requires one month stratification at about 3°C and is best sown as early as possible in the year. Prick out the seedlings when they are large enough to handle and grow on in a cold frame. Plant them out into their permanent positions in late spring of the following year. Cuttings of half-ripe wood, July/August in a frame[200]. Tip layering in July. Plant out in autumn. Division in early spring or just before leaf-fall in the autumn[200].

nwatta Easily grown in a good well-drained loamy soil in sun or semi-shade[1, 11, 200]. This species is a blackberry with biennial stems, it produces a number of new stems each year from the perennial rootstock, these stems fruit in their second year and then die[200]. The stems are free from prickles[235]. The plant produces apomictic flowers, these produce fruit and viable seed without fertilization, each seedling is a genetic copy of the parent[200]. Plants in this genus are notably susceptible to honey fungus[200].

4.2.31 Lonicera caerulea

Sweetberry honeysuckle, Bluefly honeysuckle, Haskap berry
3 tlin 9 cyuc 4 kcaak 0 tcan 0 dwat 2 m hkuc
htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprkikwis hpa7tmwatli dyaxtre7t hjonli

drutta Lonicera caerulea is a deciduous Shrub growing to 2 m (6ft 7in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 2. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: The following report is for the closely related *L. villosa*, it would be worth while experimenting with this plant to check on edibility[*K*]. The fruit of this species is about 5mm in diameter[235]. Fruit - raw or preserved[43, 105, 200]. A milder flavour than most edible honeysuckles, they can be eaten raw but are mainly used in making jams, jellies and refreshing drinks[183].

nrakta N.E. Europe, Northern N. America - Newfoundland to Alaska and southwards. ksacta Low ground[235].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed requires 2 months cold stratification[113] and should be sown as soon as possible in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm with or without a heel, July/August in a frame. Good percentage[78]. Cuttings of mature wood of the current season's growth, 15 - 20cm with or without a heel, November in a cold frame. Good percentage[78]. Layering in autumn[200].

nwatta Grows best in a good moist soil in a sunny position, it does not fruit so well in the shade[200]. Closely related to *L. villosa*[200]. Interesting botanically because it appears as though two flowers arise from a single ovary[11]. The fruit is actually a fleshy growth that surrounds the two ovaries[11]. A very variable species[11], there are some named forms selected for their ornamental value[200]. Plants of many haskap cultivars grow to be 1.5 to 2 meters tall and wide, can survive a large range of soil acidity, from 3.9-7.7 (optimum 5.5-6.5), requiring high organic matter, well drained soils, and plentiful sunlight for optimum productivity. *Lonicera caerulea* plants are more tolerant of wet conditions than most fruit species. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing

grained. Light brown in colour with thick, hardly distinguishable heartwood[82].

nrakta Eastern and Central N. America - Delaware, Maryland and Oklahoma. ksacta Along edges of ponds and small streams, often in standing water; from sea level to 100 metres[82, 270].

propta Seed -

nwatta Landscape Uses:Erosion control, Massing. Prefers a heavy soil and a damp situation, but it succeeds in ordinary garden soil[11]. Grows well in heavy clay soils[11]. Tolerates very infertile sites[200]. Trees are tolerant of frost, poor soil, and some salinity and water-logging[269]. Seaside alder is reported to tolerate an annual precipitation in the range of 95 to 400cm, an average annual temperature of 13, 5 to 18°C, and a pH in the range of 6. 1 to 8. 1[269]. This species has a symbiotic relationship with certain soil microorganisms, these form nodules on the roots of the plants and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. Special Features: North American native, Inconspicuous flowers or blooms. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

4.1.21 Desmodium canadense

Showy tick-trefoil
tfo2n 3 tlin 6 cyuc 0 kcaak 3 tcan 0 dwat 0.9 m hkuc
hmimhtut cyutli hgatyuuctup hwicli hrasjlutnyik hpa7tli frusflatprkikwislip hpa7tmwatli hjonli

drutta Desmodium canadense is a PERENNIAL growing to 0.9 m (3ft) by 0.6 m (2ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. It can fix Nitrogen. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

tcanta Nitrogen Fixer: A member of the Legume Family, it improves the soil by adding nitrogen. Dynamic Accumulator: Deep Taproot. Wildlife Food: The seeds are used by a variety of birds and other wildlife. Like many other members of the Bean family, this plant is highly edible to various mammalian herbivores, including deer, rabbits, groundhogs, and livestock. Some upland gamebirds and small rodents eat the seeds, including the Bobwhite, Wild Turkey, and White-Footed Mouse. Insectory. Cut flowers.

nrakta Native to eastern North America. ksacta Moist to mesic black soil prairies, moist meadows along rivers, borders of lakes, thickets, limestone glades, and areas along railroads where prairie remnants occur.

propta Seed. Stratify seed at 33-38 deg. F for 10 days, need scarification.

nwatta An erect herbaceous perennial forb. Sun: Full Sun, Partial Shade. Soil Type: Loamy, Silty. Soil Moisture: Moderate, Dry. Soil pH: 5.0 - 8.0. Indifferent to soil acidity. Growth Rate: Moderate. Life Span: Long-Lived Perennial. Stand Persistence: Long. Form: Upright. Texture: Medium. Minimum Root Depth: 0.2m or 8 inches. Root Type: Rhizome. Seasonal Interest: Summer. Fruit Type: Pod. Flower Color: Pink. USDA Hardiness Zones: 3 - 8. Drought: Tolerant. Flood: Moderate. Salt: Moderate. Soil Compaction: Moderate. Mowing: Tolerant. Fire Damage: Tolerant. Cold Injury: Infrequent. Disease Issues: Minor. Insect/Pest Damage: Minor. Growing Season: Warm. Bloom Time: Summer - Late Summer [318-1]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

4.2 mran

4.2.1 Tilia x europaea

Linden, Common Lime

3 tlin 9 cyuc 5 kcaak 3 tcan 3 dwat 35 m hkuc
hmimhtut cyutli tcup hwicli hyishrasjlutnyik hpa7tli flatprkikwis hpa7tmwatli xre7t hjonli

drutta Tilia x europaea is a deciduous Tree growing to 35 m (114ft) by 15 m (49ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

pcista If the flowers used for making tea are too old, they may produce symptoms of narcotic intoxication[4].

kcakta Edible Parts: Flowers Leaves Manna SapEdible Uses: Chocolate Sweetener TeaYoung leaves - raw[6, 177, 183]. Excellent in salads, they are mild and mucilaginous. A refreshing tea is made from the dried flowers[183]. A honey-like fragrance[183]. Some caution is advised, see notes above on toxicity. Flowers - used as a vegetable[183]. A very acceptable chocolate substitute can be made from a paste of the ground-up flowers and immature fruit. Trials on marketing the product failed because the paste is very apt to decompose[2, 115]. Sap - used as a drink or concentrated to make a syrup and used as a sweetener[4, 115, 183]. An edible manna is obtained from the tree[183]. No further details, does this report refer to the sap?

tcanta Charcoal Fibre Paper WoodA fibre from the inner bark is used to make mats, shoes, baskets, ropes etc[1, 13, 14, 46, 61, 100]. It is also suitable for cloth[115]. It is harvested from trunks that are 15 - 30cm in diameter[115]. The fibre can also be used for making paper[189]. The stems are harvested in spring or summer, the leaves are removed and the stems steamed until the fibres can be stripped. The outer bark is removed from the inner bark by peeling or scraping. The fibres are cooked for 2 hours with lye and then beaten in a ball mill. The paper is beige in colour[189]. Wood - soft, white, easily carved. It is very suitable for carving domestic items and small non-durable items[4, 13, 46, 61, 115]. A charcoal made from the wood is used for drawing[46, 61, 115]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Antispasmodic Cholagogue Diaphoretic Diuretic Emollient Expectorant Hypotensive Sedative Skin VasodilatorLime flowers are a popular domestic remedy for a number of ailments, especially in the treatment of colds and other ailments where sweating is desirable[9]. A tea made from the fresh or dried flowers is antispasmodic, diaphoretic, expectorant, hypotensive, laxative and sedative[4, 9, 13, 226, 238]. Lime flower tea is also used internally in the treatment of indigestion, hypertension, hardening of the arteries, hysteria, nervous vomiting or palpitation[4, 238]. The flowers are harvested commercially and often sold in health shops etc[226]. Lime flowers are said to develop narcotic properties as they age and so they should only be harvested when freshly opened[238]. A charcoal made from the wood is used in the treatment of gastric or dyspeptic disturbances and is also made into a powder then applied to burns or sore places[4].

nrakta A hybrid, probably *T. cordata* x *T. platyphyllos*. ksacta Not known in a truly wild situation.

propta Seed - much of the seed produced in Britain is not viable, cut a few seedcases open to see if there is a seed inside[80]. If possible, obtain fresh seed that is ripe but has not as yet developed a hard seed coat and sow it immediately in a cold frame. It may germinate in the following spring though it could take 18 months[80]. Stored seed can be very slow to germinate. It has a hard seed coat, embryo dormancy and a hard coat on the pericarp. All these factors mean that the seed may take up to 8 years to germinate[80]. One way of shortening this time is to stratify the seed for 5 months at high temperatures (10°C at night, up to 30°C by day) and then 5 months cold stratification[80]. When they are large

enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Layering in spring just before the leaves unfurl. Takes 1 - 3 years[78]. Suckers, when formed, can be removed with as much root as possible during the dormant season and replanted immediately[200].

nwatta Prefers a good moist loamy alkaline to neutral soil but succeeds on slightly acid soils[11, 200]. Grows poorly on any very dry or very wet soil[200]. Succeeds on poorer soils than *T. platyphyllos*[11, 14]. Tolerates considerable exposure[125]. A very valuable bee plant[11]. The flowers are toxic to bees[188]. A food plant for the caterpillars of many butterfly and moth species[30]. This tree is frequently infested by aphids[17, 200], which cover the ground and the leaves with a sticky honeydew[188]. Although a hybrid species, it does produce fertile seed in Britain[17]. Lime trees tend to hybridise freely if other members of the genus are growing nearby[238]. If growing plants from seed it is important to ensure the seed came from a wild source or from an isolated clump of the single species[K]. Easily transplanted, even when quite large, trees up to 60 years old have been moved successfully[1, 74]. Can be coppiced, the tree produces suckers very freely[98, 200]. Grows best in a woodland situation, young plants tolerate a reasonable level of shade[200]. Plants in this genus are notably resistant to honey fungus[200]. Note: *Tilia* × *vulgaris* B.Heyne is a synonym of *Tilia* × *europaea* L. The plant is heat tolerant in zones 7 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A sprouting standard sending up shoots from the base [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

4.2.2 Ginkgo biloba

Maidenhair Tree, Ginkgo

3 tin 8 cyuc 5 kcak 2 tcan 5 dwat 30 m hkuc htuc cyuti hgtakyuctcup hwicli hrasj[utnyik hpa7tli flatprikli-wis hpa7tmwatli nyanhjen hjonli

drutta *Ginkgo biloba* is a deciduous Tree growing to 30 m (98ft) by 9 m (29ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from April to May, and the seeds ripen from October to November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required) and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. It can tolerate atmospheric pollution.

pcista The seed contains a mildly acrimonious principle that is unstable when heated. It is therefore best to cook the seed before eating it to ensure any possible toxicity is destroyed. This acrimonious principle is probably 4'-methoxypropyridoxine, which can destroy vitamin B6[237]. It is more toxic for children, but the raw nuts would have to be eaten often over a period of time for the negative effects to become apparent[237]. Avoid if known allergy to Ginkgo or cross-react species (cashew, poison ivy). Not recommended for children. Avoid if on blood thinning medication (e.g. warfarin). Discontinue prior to surgery. Avoid parenteral use as possible hypotension, shock, dizziness. Excessive seed ingestion can cause 'gin-man' food poisoning [301].

kcakta Edible Parts: Oil Oil SeedEdible Uses: Oil OilSeed - raw (in small quantities), or cooked[237]. A soft and oily texture[229], the seed has a sweet flavour[2, 63] and

tastes somewhat like a large pine nut[237]. The baked seed makes very pleasant eating, it has a taste rather like a cross between potatoes and sweet chestnuts[K]. The seed can be boiled and used in soups, porridges etc[183, 237]. It needs to be heated before being eaten in order to destroy a mildly acrimonious principle[57]. Another report says that the seed can be eaten raw[132] whilst another says that large quantities of the seed are toxic[218]. See the notes above on toxicity for more details[237]. The raw seed is said to have a fish-like flavour[218]. The seed is rich in niacin[160]. It is a good source of starch and protein, but is low in fats[237]. These fats are mostly unsaturated or monosaturated[237]. A more detailed nutritional analysis is available[218]. An edible oil is obtained from the seed[2, 183].

tcanta Oil Oil Soap WoodAn oil from the seed is used as a fuel in lighting[2]. A soap substitute is produced by mixing the pulp of the seed (is the fruit meant here?) with oil or wine[178]. Wood - light, soft, it has insect repelling qualities[117].

dwatta Antianxiety Antiasthmatic Antibacterial Antifungal Astringent Cancer Digestive Expectorant Infertility Ophthalmic Sedative Tonic Urinary VermifugeGinkgo has a long history of medicinal use in traditional Chinese medicine, where the seed is most commonly used. These uses are mentioned in more detail later. Recent research into the plant has discovered a range of medicinally active compounds in the leaves and this has excited a lot of interest in the health-promoting potential of the plant[237]. In particular, the leaves stimulate the blood circulation and have a tonic effect on the brain, reducing lethargy, improving memory and giving an improved sense of well-being[237]. They have also been shown to be effective in improving peripheral arterial circulation[218, 237] and in treating hearing disorders such as tinnitus where these result from poor circulation or damage by free radicals[237]. The leaves contain ginkgolides, these are compounds that are unknown in any other plant species[238]. Ginkgolides inhibit allergic responses and so are of use in treating disorders such as asthma[238]. Eye disorders and senility have also responded to treatment[237]. The leaves are best harvested in the late summer or early autumn just before they begin to change colour. They are dried for later use[237, 238]. The fruit is antibacterial, antifungal, astringent, cancer, digestive, expectorant, sedative, vermifuge[117, 147, 176, 178]. The fruit is macerated in vegetable oil for 100 days and then the pulp is used in the treatment of pulmonary tuberculosis, asthma, bronchitis etc[218]. (This report might be referring to the seed rather than the fleshy fruit[K]). The cooked seed is antitussive, astringent and sedative[218]. It is used in the treatment of asthma, coughs with thick phlegm and urinary incontinence[176, 238]. The raw seed is said to have anticancer activity and also to be antivinous[176, 218]. It should be used with caution, however, due to reports of toxicity[176, 218]. The cooked seeds stabilize spermatogenesis[176].

nrakta E. Asia - N. China. ksacta Found wild in only 2 localities at Guizhou and on the Anhui/Zhejiang border[200], where it grows on rich sandy soils[147].

propta Seed - best sown as soon as it is ripe in a cold frame or in a sheltered outdoor bed[78, 80]. The seed requires stratification according to one report[78] whilst another says that stratification is not required[80] and that the seed can be sown in spring but that it must not have been allowed to dry out[80]. Germination is usually good to fair. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in the greenhouse for their first year. Plant them out into their permanent positions in the following spring[78, 80] and consider giving them some protection from winter cold for their first winter outdoors[K]. Softwood cuttings in a frame in spring[238]. Cuttings of half-ripe wood, July/August in a frame. The cutting may not grow away in its first year but usually grows all right after that[113]. Cuttings of mature wood, December in a frame[200].

nwatta Industrial Crop: Medicinal Management: Cop-pice Management: Standard Minor Global Crop Staple Crop: Balanced carbLandscape Uses:Firewood, Pest tolerant, Specimen, Street tree. Succeeds in most soil types so long as they are well-drained[117, 200, 202], though it prefers a rather dry loam in a position sheltered from strong winds[11]. Some of the best specimens in Britain are found growing on soils over chalk or limestone[185]. Plants flower and fruit more reliably after hot summers or when grown in

least one named variety. 'Oeschberg' is a very productive plant, growing 1 metre tall and can yield up to 2.5 tonnes per hectare[183]. This species is the most adaptable of the grain amaranths, it also flowers under a wider range of daylength hours than the other species[183]. Most if not all members of this genus photosynthesize by a more efficient method than most plants. Called the 'C4 carbon-fixation pathway', this process is particularly efficient at high temperatures, in bright sunlight and under dry conditions[196]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is clumping, giving the plant a clumping habit. The predictable growth behaviour makes it easier to maintain without having to apply containment methods[2-1].

4.2.28 Ribes aureum

Golden Currant

3 tin 8 cyuc 4 kcak 0 tcan 1 dwat 2.4 m hkuc hmimhtut cyuti kyuctcup hwicli hrasj[utnyik hpa7tli flatprikli-wis hpa7tmwatli xre7t hjonli

drutta *Ribes aureum* is a deciduous Shrub growing to 2.4 m (7ft 10in). See above for USDA hardiness. It is hardy to UK zone 2 and is not frost tender. It is in flower in April, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate strong winds but not maritime exposure.

kcakta Edible Parts: Flowers FruitEdible Uses: Fruit - raw or cooked[2, 11, 62, 101, 257]. They make an acceptable dessert fruit[K] and are also used in jellies, sauces and pies[183]. The fruit can also be dried for winter use[46, 85]. Fairly large and flavourful[85, 183]. The fruit is about 5mm in diameter[200]. Flowers - raw. A very sweet flavour[85].

dwatta Antinflammatory SalveThe dried and pulverized inner bark has been sprinkled on sores[257]. A decoction of the inner bark has been used in the treatment of leg swellings[257].

nrakta Western N. America - Saskatchewan to Washington, south to California. Naturalized in C. Europe. ksacta By streams, in ravines and on mountain slopes[60, 62]. Rocky slopes and sandy bluffs[274].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. Stored seed requires 3 months cold stratification at -2 to +2°C and should be sown as early in the year as possible[113, 164]. Under normal storage conditions the seed can remain viable for 17 years or more. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter, planting them out in late spring of the following year. Cuttings of half-ripe wood, 10 - 15cm with a heel, July/August in a frame[78, 113]. Cuttings of mature wood of the current year's growth, preferably with a heel of the previous year's growth, November to February in a cold frame or sheltered bed outdoors[78, 200].

nwatta Easily grown in a moisture retentive but well-drained loamy soil of at least moderate quality[111]. Succeeds in full sun but is also quite tolerant of shade though not fruiting so well in such a position[111]. Grows well on exposed dry sites[85]. Very tolerant of being transplanted[85]. Plants can spread by means of underground rhizomes, especially when growing in moist conditions[164]. Hardy to about -20°C[200]. The fruit can be red, black, yellow, golden or reddish-brown[164]. A very ornamental plant[1], it is closely allied to *R. odoratum*[11]. Plants can harbour a stage of white pine blister rust, so should not be grown in the vicinity of pine trees[155]. Plants in this genus are notably susceptible to honey fungus[200]. Sometimes cultivated for its edible fruit, there are some named varieties[183]. The plant is heat tolerant in zones 8 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this tempera-

ture, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2]. The root pattern is a heart root, dividing from the crown into several primary roots going down and out [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

4.2.29 Arctium lappa

Great Burdock, Gobo

3 tin 7 cyuc 4 kcak 2 tcan 5 dwat 2 m hkuc hmimhtut cyuti tcup hwicli hrasj[utnyik hpa7tli flatprikli-wis hpa7tmwatli fyifkxre7t hjonli

drutta *Arctium lappa* is a BIENNIAL growing to 2 m (6ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from July to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Care should be taken if harvesting the seed in any quantity since tiny hairs from the seeds can be inhaled and these are toxic[205]. Can cause allergic reactions. Contraindicated during pregnancy[301].

kcakta Edible Parts: Leaves Root Seed StemEdible Uses: Root - raw or cooked[2, 7, 9, 14, 179]. Very young roots can be eaten raw, but older roots are normally cooked[206]. They can be up to 120cm long and 2.5cm wide at the top, but are best harvested when no more than 60cm long[206]. Old and very long roots are apt to become woody at the core[206]. Although it does not have much flavour the root can absorb other flavours[116]. Young roots have a mild flavour, but this becomes stronger as the root gets older[206]. The root is white but discolours rapidly when exposed to the air[206]. Roots can be dried for later use[213]. They contain about 2.5% protein, 0.14% fat, 14.5% carbohydrate, 1.17% ash[179]. The root contains about 45% inulin[240]. Inulin is a starch that cannot be digested by the human body, and thus passes straight through the digestive system. In some people this starch will cause fermentation in the gut, resulting in wind[K]. Inulin can be converted into a sweetener that is suitable for diabetics to eat[K]. Young leaves - raw or cooked[9, 12, 14, 62]. A mucilaginous texture[179]. The leaves contain about 3.5% protein, 1.8% fat, 19.4% carbohydrate, 8.8% ash[179]. Young stalks and branches - raw or cooked[2, 9, 52, 55, 62]. Used like asparagus or spinach[12, 183]. They taste best if the rind is removed[85, 117]. The leaf stalks can be parboiled and used as a substitute for cardoons[183]. The pith of the flowering stem can be eaten raw in salads, boiled or made into confections[4, 183]. A delicate vegetable, somewhat like asparagus in flavour[4]. The seeds can be sprouted and used like bean-sprouts[12, 52, 183].

tcanta HairThe juice of the plant, when used as a friction, is said to have a stimulating action against baldness[7].

dwatta Alterative Antibacterial Antifungal Antiphlogistic Antipsoriatic Aperient Blood purifier Carminative Cholagogue Depurative Diaphoretic Diuretic Eczema Hypoglycaemic StomachicBurdock is one of the foremost detoxifying herbs in both Chinese and Western herbal medicine[254]. The dried root of one year old plants is the official herb, but the leaves and fruits can also be used[4]. It is used to treat conditions caused by an 'overload' of toxins, such as throat and other infections, boils, rashes and other skin problems[254]. The root is thought to be particularly good at helping to eliminate heavy metals from the body[254]. The plant is also part of a North American formula called *essiac* which is a popular treatment for cancer. Its effectiveness has never been reliably proven or disproven since controlled studies have not been carried out. The other herbs included in the formula are *Rumex acetosella*, *Ulmus rubra*

asthma, diarrhoea and stomatitis[222]. A poultice of the leaves has been used to treat skin rashes[257]. The leaves have been chewed to treat sore gums and they have been rubbed on the lips to treat sore lips[257]. The berries are diuretic, emetic, emmenagogue, purgative and refrigerant[4, 257]. They are used in the treatment of late-onset diabetes, stranguary bowel complaints, febrile diseases, dysmenorrhoea etc[4, 254, 257]. They have been chewed as a remedy for bed-wetting[222, 257]. The blossoms have been chewed as a treatment for sore mouths[257]. A decoction of the blossoms has been used as a mouthwash for teething children[257]. An infusion of the blossoms has been used as an eye wash for sore eyes[257].

nrakta N. America - found in all 48 mainland states of USA[214] and in southern Canada. ksacta Thickets and waste ground on dry soil and by streams[4, 43, 60]. The best specimens are found in rich moist soil[149, 229].

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

nwatta Landscape Uses:Border, Specimen. Succeeds in a well-drained fertile soil in full sun[11, 200]. Tolerates poor sandy soils[200]. A very hardy plant, when fully dormant it can tolerate temperatures down to at least -25°C[200]. However, the young growth in spring can be damaged by late frosts. A fast-growing but short-lived plant in the wild[229]. Single-stem plants are short-lived in cultivation, but if the plants are coppiced regularly and allowed to form thickets, then they will live longer and also be more ornamental with larger leaves[238]. Any coppicing is best carried out in early spring[238]. It is a very ornamental plant, there are some named varieties[182]. Closely allied to *R. typhina*[11], it hybridizes with that species where their ranges overlap[101, 229]. Plants have brittle branches and these can be broken off in strong winds[200]. Plants are also susceptible to coral spot fungus[11]. Plants in this genus are notably resistant to honey fungus[200]. A good bee plant[K]. Many of the species in this genus are highly toxic and can also cause severe irritation to the skin of some people, whilst other species such as this one are not poisonous. It is relatively simple to distinguish which is which, the poisonous species have axillary panicles and smooth fruits whilst non-poisonous species have compound terminal panicles and fruits covered with acid crimson hairs[1, 4]. The toxic species are sometimes separated into their own genus, *Toxicodendron*, by some botanists[200]. Dioecious. Male and female plants must be grown if seed is required. Special Features: Attracts birds, North American native, Attractive flowers or blooms. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a running thicket former forming a colony from shoots away from the crown spreading indefinitely [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

4.2.27 *Amaranthus cruentus*

Purple Amaranth, Red amaranth
3 tlin 11 cyuc 4 kcaak 2 tcan 2 dwat 2 m hkuc
htut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatprikliwis hpa7tmwatli fyif hjonli

drutta *Amaranthus cruentus* is a ANNUAL growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 4 and is frost tender. It is in flower from July to September, and the seeds ripen from August to September. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitability pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It cannot grow in the shade. It prefers moist soil.

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

kcakta Edible Parts: Leaves SeedEdible Uses: ColouringLeaves - cooked as a spinach[183]. The mild-flavoured leaves are rich in vitamins and minerals[183]. Seed - very small but easy to harvest and very nutritious. They are eaten cooked or ground into a powder and used for making cakes etc[183, 257]. They can also be sprouted and used in salads[183]. The seed can be cooked whole, and becomes very gelatinous like this, but it is rather difficult to crush all of the small seeds in the mouth and thus some of the seed will pass right through the digestive system without being assimilated[K]. The flowers are used as a food colouring in ceremonial maize bread[183].

tcanta DyeYellow and green dyes can be obtained from the whole plant[168].

dwatta The plant can be cultivated from the tropics to the temperate zone. It grows best in areas where annual daytime temperatures are within the range 22 - 28°C, but can tolerate 10 - 45°C[418]. It can be killed by temperatures of 4°C or lower[418]. It prefers a mean annual rainfall in the range 2,000 - 2,400mm, but tolerates 500 - 4,000mm[418]. Prefers a well-drained fertile soil in a sunny position[200]. Requires a hot sheltered position if it is to do well[K]. Prefers a pH in the range 5.5 - 7, tolerating 4.3 - 7.5[418]. Often cultivated as a food crop and ornamental plant, it has escaped from cultivation in many areas and become naturalised as a weed of cultivated and disturbed ground[305]. A fast-growing plant, the first crop of leaves can be harvested in 30 - 50 days from sowing the seed, and the plant can carry on being harvested for up to another 250 days[418]. Grain yields usually range from 800-1200 kg/ha but with the use of fertilizers the yield can be raised up to 3 t/ha. This species is cultivated for its edible seed in many parts of S. America and in Japan[58 , 97 , 183]. There is at least one named variety, 'Oeschberg' is a very productive plant, growing 1 metre tall and can yield up to 2.5 tonnes per hectare[183]. This species is the most adaptable of the grain amaranths, it also flowers under a wider range of daylength hours than the other species[183]. Plants are particularly susceptible to attacks by leaf-chewing insects[298]. Plants should not be given inorganic fertilizers, see notes above on toxicity. Most if not all members of this genus photosynthesize by a more efficient method than most plants. Called the 'C4 carbon-fixation pathway', this process is particularly efficient at high temperatures, in bright sunlight and under dry conditions[196].

nrakta Original habitat is obscure, it was probably tropical America. ksacta Not known in a truly wild situation.

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

nwatta Prefers a well-drained fertile soil in a sunny position[200]. Requires a hot sheltered position if it is to do well[K]. Tolerates a pH in the range 4 to 7.5. Plants should not be given inorganic fertilizers, see notes above on toxicity. This species is cultivated for its edible seed in many parts of S. America and in Japan[58, 97, 183]. There is at

a warm sunny position[202]. Established plants are drought resistant[117], they also tolerate atmospheric pollution[117, 200]. Plants can grow in poor hard-packed soil, making the male forms good candidates for street planting[229]. Trees are often used for street planting in towns, only the males are used because the fruit from female plants has a nauseous smell. The fruit contains butanoic acid, it has the aroma of rancid butter[200]. Ginkgo is a very ornamental plant[1, 117] and there are several named forms[11, 200]. This species is the only surviving member of a family that was believed to be extinct until fairly recent times. It has probably remained virtually unchanged for at least 150 million years and might have been growing when the dinosaurs were roaming the earth[237]. It is exceptional in having motile sperm[185] and fertilization may not take place until after the seed has fallen from the tree[81]. This genus belongs to a very ancient order and has affinities with tree ferns and cycads[185]. The ginkgo is usually slow growing, averaging less than 30cm per year with growth taking place from late May to the end of August[185]. Growth is also unpredictable, in some years trees may not put on any new growth whilst in others there may be 1 metre of growth[185]. This variability does not seem to be connected to water or nutrient availability. Trees are probably long-lived in Britain, one of the original plantings (in 1758) is still growing and healthy at Kew (1993). Plants are not troubled by insects or diseases[132, 200], have they evolved a resistance?[132]. Ginkgo is a popular food and medicinal crop in China, the plants are often cultivated for this purpose and are commonly grown in and around temples. Plants are either male or female, one male plant can pollinate up to 5 females. It takes up to 35 years from seed for plants to come into bearing[117]. Prior to maturity the sexes can often be distinguished because female plants tend to have almost horizontal branches and deeply incised leaves whilst males have branches at a sharper angle to the trunk and their leaves are not so deeply lobed[132]. Branches of male trees can be grafted onto female frees in order to fertilize them. When a branch from a female plant was grafted onto a male plant at Kew it fruited prolifically[11]. Female trees have often been seen in various gardens with good crops of fruit[K]. Seeds are marked by two or three longitudinal ridges, it is said that those with two ridges produce female plants whilst those with three ridges produce male plants[178]. Trees can be coppiced[200]. They can also be pruned into a fan-shape for growing on walls[202]. Another report says that the trees dislike pruning and will often die back as a result[238]. Special Features:Attractive foliage, Not North American native, Fragrant flowers, Inconspicuous flowers or blooms, Flowers have an unpleasant odor. The plant is heat tolerant in zones 9 through 3. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2].

4.2.3 *Tilia cordata*

Small Leaved Lime, Littleleaf linden
3 tlin 7 cyuc 5 kcaak 3 tcan 3 dwat 30 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Tilia cordata* is a deciduous Tree growing to 30 m (98ft) by 12 m (39ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from June to July, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitability pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers

moist soil. The plant can tolerate strong winds but not maritime exposure.

pcista If the flowers used for making tea are too old, they may produce symptoms of narcotic intoxication[4].

kcakta Edible Parts: Leaves SapEdible Uses: Chocolate TeaYoung leaves - raw[2]. They make an excellent salad or sandwich filling, they are mild tasting and somewhat mucilaginous[K]. The leaves can be available from spring until early autumn from the young growths at the base of the tree[K]. A very acceptable chocolate substitute can be made from a paste of the ground-up flowers and immature fruit. Trials on marketing the product failed because the paste is very apt to decompose[2, 115]. A popular herb tea is made from the flowers, it has a sweet, fragrant pleasant flavour[46]. Some caution is advised, see the notes above on toxicity. Sap - harvested in the spring, it is sweet and can be used as a drink or concentrated into a syrup[4].

tcanta Charcoal Fibre Paper WoodA fibre from the inner bark is used to make mats, shoes, baskets, ropes etc[1, 13, 14, 46, 61, 100]. It is also suitable for cloth[115]. It is harvested from trunks that are 15 - 30cm in diameter[115]. The fibre can also be used for making paper[189]. The stems are harvested in spring or summer, the leaves are removed and the stems steamed until the fibres can be stripped. The outer bark is removed from the inner bark by peeling or scraping. The fibres are cooked for 2 hours with lye and then beaten in a ball mill. The paper is beige in colour[189]. Wood - soft, white, easily carved. It is very suitable for carving domestic items and small non-durable items[4, 13, 46, 61, 115]. A charcoal made from the wood is used for drawing[46, 61, 115].

dwatta Antispasmodic Diaphoretic Expectorant Hypotensive Laxative Sedative SkinLime flowers are a popular domestic remedy for a number of ailments, especially in the treatment of colds and other ailments where sweating is desirable[9]. A tea made from the fresh or dried flowers is antispasmodic, diaphoretic, expectorant, hypotensive, laxative and sedative[4, 9, 13, 226, 238]. Lime flower tea is also used internally in the treatment of indigestion, hypertension, hardening of the arteries, hysteria, nervous vomiting or palpitation[4, 238]. The flowers are harvested commercially and often sold in health shops etc[226]. Lime flowers are said to develop narcotic properties as they age and so they should only be harvested when freshly opened[238]. A charcoal made from the wood is used in the treatment of gastric or dyspeptic disturbances and is also made into a powder then applied to burns or sore places[4].

nrakta Europe, including Britain, from Norway south and east to Spain, Siberia, Crimea and Caucasus. ksacta Woods on most fertile soils, especially limestone. It is commonly found on wooded limestone cliffs[17].

propta Seed - much of the seed produced in Britain is not viable, cut a few seedcases open to see if there is a seed inside[80]. If possible, obtain fresh seed that is ripe but has not as yet developed a hard seed coat and sow it immediately in a cold frame. It may germinate in the following spring though it could take 18 months[80]. Stored seed can be very slow to germinate. It has a hard seed coat, embryo dormancy and a hard coat on the pericarp. All these factors mean that the seed may take up to 8 years to germinate[80]. One way of shortening this time is to stratify the seed for 5 months at high temperatures (10°C at night, up to 30°C by day) and then 5 months cold stratification[80]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Layering in spring just before the leaves unfurl. Takes 1 - 3 years[78]. Suckers, when formed, can be removed with as much root as possible during the dormant season and replanted immediately[200].

nwatta Landscape Uses:Firewood, Pollard, Screen, Specimen, Street tree. Prefers a good moist loamy alkaline to neutral soil but it also succeeds on slightly acid soils[200]. Grows poorly on any very dry or very wet soil[200]. Tolerates considerable exposure[125, K]. Succeeds in sun or semi-shade[188]. Plants can be transplanted quite easily, even when large, trees up to 60 years old have been moved successfully[1, 74]. Trees are very amenable to coppicing or pollarding[186]. They produce numerous suckers from the base[98]. Suckers are produced but not freely according to another report[186]. This species produces far less suckers

than *T. platyphyllos* or *T. x vulgaris*[238]. This species grows well in Britain, but it rarely produces viable seed in areas with cool summers[200]. Lime trees tend to hybridise freely if other members of the genus are growing nearby[238]. If growing plants from seed it is important to ensure the seed came from a wild source or from an isolated clump of the single species[K]. Grows best in a woodland situation, young plants tolerate a reasonable level of side shade[186]. Mature trees cast a dense shade[186]. A very valuable bee plant, producing an abundance of nectar[186]. A valuable species for wildlife, there are 31 species of insects associated with this tree[24]. The leaves are very attractive to leaf aphids and these aphids produce an abundance of sweet secretions which drip off the leaves to the ground below and also attract sooty mould fungus[186]. This makes the tree unsuitable for street planting. This species, however, is less likely to become infested with aphids than *T. platyphyllos* or *T. x vulgaris*[238]. There are some named varieties selected for their ornamental value[188]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: Not North American native, Fragrant flowers, Attractive flowers or blooms.

4.2.4 *Malus domestica*

Apple

3 tlin 8 cyuc 5 kcaak 4 tcan 2 dwat 9 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrp hpa7tli flatprikwis hpa7tmwatli xre7t hjonli

drutta *Malus domestica* is a deciduous Tree growing to 9 m (29ft 6in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from April to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

kcaakta Edible Parts: Fruit Oil OilEdible Uses: Oil Oil PectinFruit - raw, cooked or dried for later use. Apples are one of the most common and widely grown fruits of the temperate zone. There are a great many named varieties with differing flavours ranging from sour to sweet and textures from dry and mealy to crisp and juicy. There is also a wide range in the seasons of ripening with the first fruits being ready in late July whilst other cultivars are not picked until late autumn and will store for 12 months or sometimes more. See individual records for more details. The fruit of some cultivars is rich in pectin and can be used in helping other fruits to set when making jam etc[61, 142]. Pectin is also said to protect the body against radiation[201]. An edible oil can be obtained from the seed[4]. It would only really be viable to use these seeds as an oil source if the fruit was being used for some purpose such as making cider and then the seeds could be extracted from the remaining pulp[K].

tcanta Lighting Oil Oil Pectin Teeth WoodThe fruit is a source of pectin[61, 142]. Pectin is used as a thickener in jams etc and as a culture medium in laboratories. The apple is also an excellent dentifrice, the mechanical action of eating a fruit serving to clean both the teeth and the gums[4, 269]. The oil from the seed has been used as an illuminant[269]. Wood - hard, compact, fine-grained. Used for turnery, tool handles, canes etc[46, 171, 226]. It makes an excellent fuel[226]. Espalier: tree or other plants that is trained to grow flat against a support (such as a trellis or wall).

dwatta Antibacterial Antidiarrhoeal Astringent Laxative Odontalgic StomachicThe fruit is astringent and laxative[4, 9]. The bark, and especially the root bark, is anthelmintic,

refrigerant and soporific[218, 240]. An infusion is used in the treatment of intermittent, remittent and bilious fevers[4, 240]. The leaves contain up to 2.4% of an antibacterial substance called 'phloretin'[240]. This inhibits the growth of a number of gram-positive and gram-negative bacteria in as low a concentration as 30 ppm[240]. A ripe raw apple is one of the easiest foods for the stomach to deal with, the whole process of digestion taking about 85 minutes[4]. The apple juice will reduce the acidity of the stomach, it becomes changed into alkaline carbonates and thus corrects sour fermentation[4]. The apple is also an excellent dentifrice, the mechanical action of eating a fruit serving to clean both the teeth and the gums[4].

nrakta A hybrid of garden origin, mainly involving *M. sylvestris* and *M. pumila*[200]. *ksacta* Not known in a truly wild situation.

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

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils, though if these are poorly drained there could be problems with diseases such as canker[200]. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[1, 200]. Tolerates a pH range from 6 to 7, preferring a range of 6.5 to 6.8[200]. The apple is one of the most commonly cultivated fruit crops in the temperate zone. The primary climatic requirements for the production of good quality fruit are warm summer temperatures, relative freedom from spring frosts, reasonable protection from the wind (especially cold north and east winds) and an evenly distributed rainfall of about 600 - 800mm per annum[200]. Good apple production has been achieved as far north as 65°, whilst about 1000 hours of winter temperatures below 7°C are necessary to initiate flower production[269]. However good quality apples can still be produced in other areas with careful management and choice of cultivars[200]. Even in tropical latitudes, the plant has succeeded at high elevations, producing fruit at elevations over 3000 metres in Ecuador for example[269]. Where space is at a premium, or at the limits of their climatic range, apples can be grown against a wall. Most cultivars will grow well against a sunny south or west facing wall, an east facing wall will suit many of the tougher cultivars and even a north facing wall can be used for early culinary cultivars[219]. A hybrid of mixed origins, including *M. dasyphylla*, *M. praecox*, *M. pumila*, *M. sieversii* and *M. sylvestris*, this species is very commonly cultivated in temperate areas for its edible fruit[11]. There are very many named varieties[46, 183, 200] and with careful choice of these varieties it is possible to provide freshly harvested fruit from July to December and stored fruit for the rest of the year. When chives (*Allium schoenoprasum*) or other alliums are grown under apple trees it can prevent or cure scab[18]. A spray of the infused leaves of *Equisetum* spp can also be used against scab[18, 201]. If climbing nasturtiums (*Tropaeolum majus*) are grown into the tree they can repel woolly aphids[18, 201]. Apples lose their flavour if they are stored with potatoes[18]. They will also impart a bitter flavour to carrots or potatoes if they are stored in the same area[201]. Growing apples near potatoes makes the potatoes more susceptible to blight[201]. Wrapping maple leaves (*Acer* spp) around apples in store helps to preserve the apples[18, 20]. Apples store better if they are grown in a sward that contains a high percentage of clover[201]. Apple trees grow better and produce better quality fruit when foxgloves (*Digitalis* spp) and wallflowers (*Erysimum cheiri*) are growing in the orchard[201]. Dandelions (*Taraxacum* spp) produce ethylene gas and this can cause earlier ripening of fruit if plants are growing in an orchard[18]. The fruit is a good wildlife food source, especially

4.2.25 *Rubus occidentalis*

Black Raspberry

3 tlin 7 cyuc 4 kcaak 1 tcan 2 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikwis hpa7tmwatli xre7t hjonli

drutta *Rubus occidentalis* is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kckakta Edible Parts: Fruit StemEdible Uses: TeaFruit - raw or cooked and used in pies, preserves etc[2, 3, 34, 62, 85, 101, 183]. It is of variable quality, with the finest forms having a rich acid flavour[2]. The hemispherical fruit is about 15mm in diameter[200]. Young shoots - raw or cooked like rhubarb[101, 161, 183, 257]. They are harvested as they emerge through the soil in the spring, and whilst they are still tender, and then peeled[K]. A tea is made from the leaves and another from the bark of the root[161, 183, 257].

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

dwatta Astringent Cathartic Dysentery Ophthalmic Pectoral Salve TB VDTThe roots are cathartic[257]. A decoction of the roots has been used in the treatment of gonorrhoea[257]. The root has been chewed in the treatment of coughs and toothache[257]. An infusion of the roots has been used as a wash for sore eyes[257]. The root has been used, combined with *Hypericum* spp, to treat the first stages of consumption[257]. An infusion of the astringent root bark is used in the treatment of diarrhoea and dysentery[213, 222]. The leaves are highly astringent[257]. A decoction is used in the treatment of bowel complaints[257]. A tea made from the leaves is used as a wash for old and foul sores, ulcers and boils[222, 257]. A decoction of the roots, stems and leaves has been used in the treatment of whooping cough[257].

nrakta Eastern and Central N. America - New Brunswick to Ontario, south to Georgia and Missouri. *ksacta* Rich thickets, ravines and borders of woods[43], often in full shade[62] and preferring moist positions[159].

propta Seed - requires stratification and is best sown in early autumn in a cold frame. Stored seed requires one month stratification at about 3°C and is best sown as early as possible in the year. Prick out the seedlings when they are large enough to handle and grow on in a cold frame. Plant them out into their permanent positions in late spring of the following year. Cuttings of half-ripe wood, July/August in a frame[200]. Tip layering in July. Plant out in autumn. Division in early spring or just before leaf-fall in the autumn[200].

nwatta Easily grown in a good well-drained loamy soil in sun or semi-shade[1, 11, 200]. Sometimes cultivated, especially in N. America, for its edible fruit[183], it is a parent of many named varieties[1, 34]. This species is a raspberry with biennial stems, it produces a number of new stems each year from the perennial rootstock, these stems fruit in their second year and then die[200]. Plants in this genus are notably susceptible to honey fungus[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a running thicket former forming a colony from shoots away from the crown spreading indefinitely [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

4.2.26 *Rhus glabra*

Smooth Sumach

3 tlin 9 cyuc 4 kcaak 3 tcan 3 dwat 3 m hkuc hntu cyutli kyuctup hwicli hysjhrasjlutnyik hpa7tli flatprikwis hpa7tmwatli nyanhjen hjonli

drutta *Rhus glabra* is a deciduous Shrub growing to 3 m (9ft) by 3 m (9ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 2 and is not frost tender. It is in flower from July to August, and the seeds ripen from

September to November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Bees. The plant is not self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate strong winds but not maritime exposure.

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

kckakta Edible Parts: Fruit Oil Root StemEdible Uses: Drink OilFruit - raw or cooked[2, 22, 46]. An acid flavour, it has been used as a substitute for lemon juice[2]. The fruit is rather small and with very little flesh, but it is produced on fairly large panicles and so is easily harvested. When soaked for 10 - 30 minutes in hot or cold water it makes a very refreshing lemonade-like drink (without any fizz of course)[85, 95, 101, 102, 149, 159, 183]. The mixture should not be boiled since this will release tannic acids and make the drink astringent. Root - peeled and eaten raw[161, 183]. This report should be treated with some caution due to possible toxicity[214]. Young shoots - peeled and eaten raw[183, 257]. This report should be treated with some caution due to possible toxicity[214]. The bark has been eaten as a delicacy by children[257]. This report should be treated with some caution due to possible toxicity[214].

tcanta Dye Hedge Hedge Mordant Oil Pioneer Shelterbelt Soil stabilization Tannin WoodThe leaves are rich in tannin, containing about 10 - 25%[171]. Up to 31.2% has been obtained from some plants[223]. They can be collected as they fall in the autumn and used as a brown dye or as a mordant[169]. The twigs and root are also rich in tannin[149]. A black and a red dye is obtained from the fruit[4, 257]. A black dye is obtained from the leaves, bark and roots[257]. An orange or yellow dye is obtained from the roots harvested in spring[46, 61, 257]. A light yellow dye is obtained from the pulp of the stems[257]. The inner bark, mixed with bloodroot (*Sanguinaria canadensis*) and the inner bark of wild plum (*Prunus* sp.) has been used to make a yellow dye[257]. An oil is extracted from the seeds[4]. It attains a tallow-like consistency on standing and is used to make candles. These burn brilliantly, though they emit a pungent smoke[4]. The plant has an extensive root system and is fairly wind tolerant, though branches can be broken off in very strong winds. It is planted for soil stabilization and as a shelter screen[200]. It can quickly establish itself in open sunny locations and so can be used as a pioneer species for establishing woodlands[229]. Wood - soft, light, brittle[101, 149].

dwatta Alterative Antiseptic Appetizer Astringent Diuretic Dysentery Emetic Emmenagogue Febrifuge Galactagogue Haemostatic Ophthalmic Refrigerant Rubefacient Salve TB TonicSmooth sumach was employed medicinally by various native North American Indian tribes who used it to treat a variety of complaints[257]. It is occasionally used in modern herbalism where it is valued for its astringent and antiseptic qualities. Some caution should be employed in the use of this species since it can possibly cause skin irritations. It is best only used under the supervision of a qualified practitioner. A tea made from the bark or root bark is alternative, antiseptic, astringent, galactogogue, haemostatic, rubefacient and tonic[4, 222, 238, 257]. It is used in the treatment of diarrhoea, fevers, general debility, sore mouths, rectal bleeding, uterine prolapse etc[222, 254]. It is used as a gargle to treat sore throats and applied externally to treat excessive vaginal discharge, burns and skin eruptions[254, 257]. The powdered bark can be applied as a poultice to old ulcers, it is a good antiseptic[4]. A tea made from the roots is appetizer, astringent, diuretic and emetic[222, 257]. An infusion is used in the treatment of colds, sore throats, painful urination, retention of urine and dysentery[257]. The root is harvested in the autumn and dried for later use[254]. An infusion of the green or dried branches has been used in the treatment of TB[257]. A decoction of the branches, with the seed heads, has been used to treat itchy scalps and as a bathing water for frost-bitten limbs[257]. The milky latex from the plant has been used as a salve on sores[257]. A tea made from the leaves was used in the treatment of

pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

pcista The leaves and stems of this species are poisonous[9, 76]. The fruit has been known to cause stomach upsets to some people[65, 76]. The unripe fruit contains a toxic alkaloid and cyanogenic glycosides[274]. Any toxin the fruit might contain is liable to be of very low toxicity and is destroyed when the fruit is cooked[65, 76].

kcakta Edible Parts: Flowers Fruit ShootsEdible Uses: Drink TeaFruit - raw or cooked[2, 3, 55, 85, 257]. A bitersweet flavour, the fruits are about 5mm in diameter and are borne in large clusters[200, 227]. They are at their best after being dried[62], the fresh raw fruit has a rather rank taste[101]. The fruit is normally cooked and used in pies, jams, jellies, sauces, bread etc[62, 159, 183]. Rich in vitamin C[183]. Some caution is advised, see notes above on toxicity. Flowers - raw or cooked. They are often covered in batter and made into fritters[105]. The flowers can be picked when unopened, pickled and then used as a flavouring in candies etc[149, 227]. They can also be soaked in water to make a drink[149]. A pleasant tasting tea is made from the dried flowers[21, 159, 183, 257]. Young shoots are said to be edible when cooked and to be used as an asparagus substitute[55, 105] though, since the leaves are also said to be poisonous, this report should be viewed with some doubt.

tcanta Compost Dye Hedge Insecticide Musical Pipes Plant breeding RepellentAgroforestry Uses: When grown near a compost heap, the root activity of this plant encourages fermentation in the compost heap[18]. Other Uses: The leaves and inner bark of young shoots are used as an insect repellent[6, 101, 149, 159, 257], the dried flowering shoots are said to repel insects and rodents[101]. A decoction of the leaves can be used as an insecticide[201]. It is prepared by boiling 3 - 4 handfuls of leaves in a litre of water, then straining and allowing to cool before applying. Effective against many insects, it also treats various fungal infections such as leaf rot and powdery mildew[201]. A black dye is obtained from the bark[149]. When grown near a compost heap, the root activity of this plant encourages fermentation in the compost heap[18]. The stems can be easily hollowed out to be used as drains in tapping the sap from trees such as the Sugar Maples (*Acer* spp), the stems can also be used as whistles and flutes[149, 159].

dwatta Antidiarrhoeal Antiseptic Cholera Diaphoretic Diuretic Emetic Febrifuge Kidney Laxative Poulitice Purgative Skin Stimulant Vitamin C American elder was widely employed as a medicinal herb by many native North American tribes who used it to treat a wide range of complaints[257]. It is still commonly used as a domestic remedy. A tea made from the inner bark and root bark is diuretic, emetic and a strong laxative[222, 257]. A tea made from the root bark is used to promote labour in childbirth and in treating headaches, kidney problems and mucous congestion[21, 257]. The inner bark is also applied as a poultice to cuts, sores or swollen limbs etc in order to relieve pain and swelling[222, 257]. A poultice of the leaves is applied to bruises and to cuts in order to stop the bleeding[222]. An infusion of the leaf buds is strongly purgative[21]. Elder flowers are stimulant, diaphoretic and diuretic[213, 257]. A warm tea of the flowers is stimulant and induces sweating, taken cold it is diuretic[21]. It is used in the treatment of fevers and infant colic[257]. An infusion of the leaves and flowers is used as an antiseptic wash for skin problems, wounds etc[21]. The fresh juice of the fruit, evaporated into a syrup, is laxative. It also makes a good ointment for treating burns when mixed with an oily base[21]. The dried fruit can be made into a tea that is useful in the treatment of cholera and diarrhoea[21]. Some caution should be exercised if using any part of the plant fresh since it can cause poisoning[21].

nrakta Eastern N. America - Nova Scotia to Florida, west to Manitoba and Texas. ksacta Rich moist soils along streams and rivers, woodland margins and waste ground[229].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame, when it should germinate in early spring. Stored seed can be sown in the spring in a cold frame but will probably germinate better if it is given 2 months warm followed by 2 months cold stratification first[78, 98,

113]. Prick out the seedlings into individual pots when they are large enough to handle. If good growth is made, the young plants can be placed in their permanent positions during the early summer. Otherwise, either put them in a sheltered nursery bed, or keep them in their pots in a sheltered position and plant them out in spring of the following year. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame[78]. Cuttings of mature wood of the current season's growth, 15 - 20cm with a heel, late autumn in a frame or a sheltered outdoor bed[78]. Division of suckers in the dormant season.

nwatta Agroforestry Services: Contour hedgerow Indus Crop: Dye Industrial Crop: Medicinal Management: Standard Regional CropTolerates most soils, including chalk[200], but prefers a moist loamy soil[11, 200]. Grows well in heavy clay soils. Tolerates some shade but is best in a sunny position[1]. Tolerates atmospheric pollution and coastal situations[200]. A very hardy plant, when dormant it tolerates temperatures down to about -34°C[200]. The flowers have a muscatel smell[245]. A fast-growing but short-lived plant[229], it often forms thickets by means of root suckers[200]. It is occasionally cultivated for its edible fruit, there are several named varieties[183], though these have mainly been developed for their ornamental value[182]. Yields of up to 7kg of fruit per tree have been recorded[160]. Plants in this genus are notably resistant to honey fungus[200]. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

4.2.24 Hablitzia tamnoides

Caucasian spinach

3 tlin 9 cyuc 4 kcaak 1 tcan 0 dwat 3 m hkuc pcmhmimhtut cyuti tcup hwicli hrsajlutnyik hpa7tli prikklwis hpa7tmwatli hjonli

drutta Hablitzia tamnoides is a PERENNIAL CLIMBER growing to 3 m (9ft) by 0.5 m (1ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. The flowers are pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible greens and shoots raw or cooked. Mild edible leaves similar to those of the related spinach. Add leaves to a salad. Leaves also used in soups, pies, pizza, indian and oriental food. Young shoots can be eaten.

tcanta Originally introduced to gardens in Finland, Sweden and Norway as an attractive climbing ornamental.

nrakta Origin: The Caucasus, the border of Europe and Asia ksacta Mesic woodland habitats especially spruce and beech woods in its native environment, among rocks and in ravines and along rivers.

propta Seed. Germinate at very low temperatures in early spring. Seeds need to be stratified. Cild moist treatment improves germination. Division in autumn

nwatta A woodland climber. Plant in a spot that gets sun for half the day ideally. Plants can tolerate sun for up to two thirds of the day. Will die back in the winter. Plants need something to climb on for example a bamboo trellis.

for birds[200]. Hybridizes freely with other members of this genus[200]. Plants in this genus are notably susceptible to honey fungus[200].

4.2.5 Rosa rugosa

Ramanas Rose, Rugosa rose

3 tlin 9 cyuc 5 kcaak 3 tcan 2 dwat 2 m hkuc hmimhtut cyuti kyuctcup hwicli hrsajlutnyikfrip hpa7tli flat-prikklwis hpa7tmwatli fyifxre7t hjonli

drutta Rosa rugosa is a deciduous Shrub growing to 2 m (6ft) by 2 m (6ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 2 and is not frost tender. It is in flower from June to August, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

pcista There is a layer of hairs around the seeds just beneath the flesh of the fruit. These hairs can cause irritation to the mouth and digestive tract if ingested.

kcakta Edible Parts: Flowers Fruit Seed StemEdible Uses: TeaFruit - raw or cooked[1, 2, 62]. They are very sweet and pleasant to eat, though it takes quite a bit of patience to eat any quantity[K]. The fruit is a fairly large size for a rose with a relatively thick layer of flesh[K]. The fruit is about 25mm in diameter[200]. Rich in vitamin C[3, 14], containing up to 2.75% dry weight[74]. Some care has to be taken when eating this fruit, see the notes above on known hazards. Flowers - raw or cooked[183]. An aromatic flavour, they are also used in jellies and preserves[74, 183]. Remove the bitter white base of the petals before using them. Young shoots - cooked and used as a potherb[183]. Harvested as they come through the ground in spring and are still tender. The seed is a good source of vitamin E, it can be ground into a powder and mixed with flour or added to other foods as a supplement[102, 183]. Be sure to remove the seed hairs[102]. A pleasant tasting fruity-flavoured tea is made from the fruit, it is rich in vitamin C[21]. A tea is also made from the leaves[218].

tcanta Hedge HedgeThe plant makes a good low hedge[1, 29]. It is very tolerant of maritime exposure, but is very bare in winter[K].

dwatta Cancer Hepatic Vitamin CThe leaves are used in the treatment of fevers[218]. The flowers act on the spleen and liver, promoting blood circulation[147, 218]. They are used internally in the treatment of poor appetite and digestion, and menstrual complaints arising from constrained liver energy[238]. The root is used in the treatment of coughs[218]. The fruit of many members of this genus is a very rich source of vitamins and minerals, especially in vitamins A, C and E, flavanoids and other bio-active compounds. It is also a fairly good source of essential fatty acids, which is fairly unusual for a fruit. It is being investigated as a food that is capable of reducing the incidence of cancer and also as a means of halting or reversing the growth of cancers[214].

nrakta E. Asia - N. China, Japan, Korea. Naturalized in several places in Britain[17]. ksacta Sandy sea shores[58].

propta Seed. Rose seed often takes two years to germinate. This is because it may need a warm spell of weather after a cold spell in order to mature the embryo and reduce the seedcoat[80]. One possible way to reduce this time is to scarify the seed and then place it for 2 - 3 weeks in damp peat at a temperature of 27 - 32°C (by which time the seed should have imbibed). It is then kept at 3°C for the next 4 months by which time it should be starting to germinate[80]. Alternatively, it is possible that seed harvested 'green' (when it is fully developed but before it has dried on the plant) and sown immediately will germinate in the late winter. This method has not as yet(1988) been fully tested[80]. Seed sown as soon as it is ripe in a cold frame sometimes germinates in spring though it may take 18 months. Stored seed can be sown as early in the year as possible and stratified for 6 weeks at 5°C[200]. It may take 2 years to germinate[200]. Prick out the seedlings into individual pots when they are large enough to handle. Plant out in the summer if the plants are more than 25cm tall, otherwise grow on in a cold frame for the winter and plant

out in late spring. Cuttings of half-ripe wood with a heel, July in a shaded frame. Overwinter the plants in the frame and plant out in late spring[78]. High percentage[78]. Cuttings of mature wood of the current seasons growth. Select pencil thick shoots in early autumn that are about 20 - 25cm long and plant them in a sheltered position outdoors or in a cold frame[78, 200]. The cuttings can take 12 months to establish but a high percentage of them normally succeed[78]. Division of suckers in the dormant season. Plant them out direct into their permanent positions. Layering. Takes 12 months[11].

nwatta Prefers a light well-drained soil but succeeds in most soils including dry ones[11, 14, 200]. Grows well in heavy clay soils[200]. Prefers a circumneutral soil and a sunny position[200]. Dislikes water-logged soils[200]. Tolerates maritime exposure[14, K]. Plants are said to withstand temperatures down to -50°C without damage[160]. The foliage is said to resist disease[11]. A very ornamental plant[1], it suckers freely but these are fairly easily controlled[K]. There are a number of named varieties[11]. 'Scabrosa' is said to be larger in all its parts, including the fruit[200], though it has not proved to be much larger with us[K]. The flowers have a clove-like perfume[245]. Grows well with alliums, parsley, mignonette and lupins[18, 20]. Dislikes boxwood[18]. Garlic planted nearby can help protect the plant from disease and insect predation[18, 20]. Hybridizes freely with other members of this genus[80]. Plants in this genus are notably susceptible to honey fungus[200]. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a running thicket former forming a colony from shoots away from the crown spreading indefinitely [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

4.2.6 Hemerocallis fulva

Common Day Lily, Orange daylily, Tawny Daylily, Double Daylily

3 tlin 10 cyuc 5 kcaak 2 tcan 2 dwat 1 m hkuc hmimhtut cyuti kyuctcup hwicli hrsajlutnyikfrip hpa7tli flat-prikklwis hpa7tmwatli dyatlxre7t hjonli

drutta Hemerocallis fulva is a PERENNIAL growing to 1 m (3ft 3in) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from June to August. The species is hermaphrodite (has both male and female organs). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Large quantities of the leaves are said to be hallucinogenic[127, 137]. Blanching the leaves removes this hallucinatory component[205]. (This report does not make clear what it means by blanching, it could be excluding light from the growing shoots or immersing in boiling water[K].)

kcakta Edible Parts: Flowers Leaves Root ShootsEdible Uses: Leaves and young shoots - cooked[85, 116, 179, 183]. An asparagus or celery substitute. An excellent sweet tasting vegetable[179, K], though some caution is recommended[127, 137]. The leaves need to be eaten whilst still very young since they quickly become fibrous[K]. Flowers - raw or cooked[62, 100]. The petals are thick and crunchy, making very pleasant eating raw, with a nice sweetness at the base because of the nectar[K]. The flowers can also be dried and used as a thickener in soups etc[62, 183]. In this case, they are picked when somewhat withered and closed[85]. A rich source of iron[218]. Flower buds - raw or cooked[62, 100, 105, 116]. A pea-like flavour[85]. Can be

dried and used as a relish[178]. The dried flower contains about 9.3% protein. 25% fat[?], 60% carbohydrate (rich in sugar), 0.9% ash. It is rich in vitamin A[179]. Tubers - raw or cooked[183]. A nutty flavour[62]. Young tubers are best, though the central portion of older tubers is also good[85].

tcanta WeavingThe tough dried foliage is plaited into cord and used for making footwear[205]. Plants form a spreading clump and are suitable for ground cover when spaced about 90cm apart each way[208]. The dead leaves should be left on the ground in the winter to ensure effective cover[208]. The cultivar 'Kwanso Flore Pleno' has been especially mentioned[208].

dwatta Anodyne Anthelmintic Antidote Antiemetic Antispasmodic Blood purifier Cancer Depurative Diuretic Febrifuge Laxative SedativeDiuretic, febrifuge, laxative (mild)[62, 178, 205]. The flowers are anodyne, antiemetic, antispasmodic, depurative, febrifuge and sedative[218]. In China they are used as an anodyne for women in childbirth[240]. An extract of the flowers is used as a blood purifier[240]. The rhizome has shown antimicrobial activity, it is also tuberculostatic and has an action against the parasitic worms that cause filariasis[279]. It is used in Korea to treat opilation, jaundice, constipation and pneumonia[279]. The juice of the roots is an effective antidote in cases of arsenic poisoning[205]. The root also has a folk history of use in the treatment of cancer - extracts from the roots have shown antitumour activity[218]. A tea made from the boiled roots is used as a diuretic[205, 218].

nrakta Of uncertain origin. A garden escape in Britain. ksacta Common and widespread in the wild[205], probably as an escape from cultivation.

propta Seed - sow in the middle of spring in a greenhouse. Germination is usually fairly rapid and good. Prick out the seedlings into individual pots when they are large enough to handle. Grow the plants on for their first winter in a greenhouse and plant out in late spring[K]. Division in spring or after flowering in late summer or autumn[200]. Division is very quick and easy, succeeding at almost any time of the year[K]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Landscape Uses:Border, Erosion control, Ground cover, Massing. Succeeds in moist soils[1], including dry ones, though it prefers a rich moist soil[11] and a sunny position but tolerating partial shade[88, 111]. Plants flower less freely in a shady position though the flowers can last longer in such a position[205]. Grows well in heavy clay soils. Succeeds in short grass if the soil is moist[1]. Prefers a pH between 6 and 7[200]. This species is hardy to about -20°C[187]. Plants take a year or two to become established after being moved[200]. The roots have spindle-shaped swellings and spread freely, the plant can become invasive[205]. A very ornamental plant[1], it is cultivated in China and Japan for its edible flowers and leaves, there are many named varieties[200]. Individual flowers are short-lived, opening in the morning and withering in the evening. The plant, however, produces a succession of flowers over a period of about 6 weeks[205]. The sterile cultivar 'Kwanzo' has double flowers, it has been especially mentioned for these flowers which are said to be crunchy with a nutty aftertaste[137]. 'Flore Pleno' is another form with double-flowers that have a delicious taste[K]. The sterile cultivar 'Europa' is very vigorous, with long stolons, and each piece of root is capable of growing into a new plant[205]. This cultivar, which is the form usually supplied from nurseries, succeeds in lawns and has even been known to grow through tarmac[205]. Hybridizes freely with other members of this genus[200]. Many forms of this plant are sterile triploids, probably of garden origin, and do not set seed[205]. The pollen, however, is fertile and can be used to fertilize other plants[205]. The plants are very susceptible to slug and snail damage, the young growth in spring is especially at risk[200]. Special Features: Naturalizing, Attracts butterflies, Suitable for cut flowers, Attractive flowers or blooms. The plant is heat tolerant in zones 12 through 2. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage.

Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2]. The root pattern is tuberous with swollen potato-like roots [1-2].

4.2.7 Althaea officinalis

Marsh Mallow, Common marshmallow

3 tlin 7 cyuc 5 kcaak 3 tcan 5 dwat 1.2 m hkuc htuc cyutli kyuctcup hwicli hrasjlutnyikrip hpa7tli flatprikwish-som hpa7tmwatli fyfxre7t hjonli

drutta Althaea officinalis is a PERENNIAL growing to 1.2 m (4ft) by 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acidic, neutral and basic (mildly alkaline) soils and can grow in saline soils. It cannot grow in the shade. It prefers dry or moist soil.

pcista No documented adverse effects but anecdotal reports allergic reaction and lower blood sugar.

kcakta Edible Parts: Leaves Oil RootEdible Uses: Egg Oil TeaLeaves - raw or cooked[2, 4, 100]. They are used as a potherb or to thicken soups[62, 183]. When used as a small proportion with other leaves, the taste and texture is acceptable, but if a lot of the leaves are cooked together their mucilaginous texture makes them unpalatable[K]. The leaves can be eaten raw but are rather fibrous and somewhat hairy, though the taste is mild and pleasant[K]. We have found them to be quite acceptable in salads when chopped up finely[K]. Root - raw or cooked[61]. When boiled and then fried with onions it is said to make a palatable dish that is often used in times of shortage[4]. The root is used as a vegetable[62, 141, 183], it is also dried then ground into a powder, made into a paste and roasted to make the sweet 'marshmallow'[4, 5, 7, 17, 61]. The root contains about 37% starch, 11% mucilage, 11% pectin[254]. The water left over from cooking any part of the plant can be used as an egg-white substitute in making meringues etc[62]. The water from the root is the most effective[183], it is concentrated by boiling until it has a similar consistency to egg white. A tea is made from the flowers[183]. A tea can also be made from the root[183].

tcanta Adhesive Fibre Oil TeethThe dried root is used as a toothbrush or is chewed by teething children[6, 7]. It has a mechanical affect on the gums whilst also helping to ease the pain. The root is also used as a cosmetic, helping to soften the skin[7]. A fibre from the stem and roots is used in paper-making[46, 61, 74, 115]. The dried and powdered root has been used to bind the active ingredients when making pills for medicinal use[268]. A glue can be made from the root[74]. The root is boiled in water until a thick syrup is left in the pan, this syrup is used as a glue. An oil from the seed is used in making paints and varnishes[74].

dwatta Antidiarrhoeal Antitussive Demulcent Diuretic Emollient Laxative Odontalgic UrinaryMarsh mallow is a very useful household medicinal herb. Its soothing demulcent properties make it very effective in treating inflammations and irritations of the mucous membranes such as the alimentary canal, the urinary and the respiratory organs[4, 254]. The root counters excess stomach acid, peptic ulceration and gastritis[254]. It is also applied externally to bruises, sprains, aching muscles, insect bites, skin inflammations, splinters etc[4, 238]. The whole plant, but especially the root, is antitussive, demulcent, diuretic, highly emollient, slightly laxative and odontalgic[4, 17, 21, 46, 165]. An infusion of the leaves is used to treat cystitis and frequent urination[254]. The leaves are harvested in August when the plant is just coming into flower and can be dried for later use[4]. The root can be used in an ointment for treating boils and abscesses[254]. The root is best harvested in the autumn, preferably from 2 year old plants, and is dried for later use[238]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve *Althaea officinalis*

hmimhtut cyutli hgattcup hwicli hrasjlutnyikrip hpa7tli flatprikwis hpa7tmwatli xre7t hjonli

drutta Malus prunifolia is a deciduous Tree growing to 8 m (26ft) by 8 m (26ft). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from April to May, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acidic, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought.

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

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[183]. A bitter flavour[K]. Fruits we have tasted have been astringent rather than bitter, though some cultivars and forms are not at all bitter. A fruit of the species, tasted at Kew in October 1991, had a sweet pleasant taste, was mealy and of low acidity[K]. The fruit can be used fresh or in preserves etc. The fruit is about 20mm in diameter[200], though some forms are considerably larger[K].

tcanta RootstockThis species is an excellent stock for grafting apple trees[266].

nrakta E. Asia - northern China. ksacta Slopesand plains from sea level to 1300 metres[266].

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

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[200]. Highly resistant to frost and drought, this species is being used to a limited extent in breeding programmes for cultivated apples[183]. The cultivar 'Hyslop' has edible fruits 4cm in diameter[200]. Hybridizes freely with other members of this genus[200]. The fruit is a good wildlife food source, especially for birds[200]. Plants in this genus are notably susceptible to honey fungus[200].

4.2.22 Malus pumila

Paradise Apple, Common Apple, Apple Tree

3 tlin 9 cyuc 4 kcaak 3 tcan 2 dwat 7 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikrip hpa7tli flatprikwis hpa7tmwatli xre7t hjonli

drutta Malus pumila is a deciduous Tree growing to 7 m (23ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower in April. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acidic, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All members of this genus contain the toxin hydrogen cyanide in their seeds and possibly also in their leaves, but not in their fruits. Hydrogen cyanide is the substance

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

kcakta Edible Parts: FruitEdible Uses: Fruit - raw, cooked in pies, cakes etc or fermented into cider[183]. The taste can be sweet and pleasant. The fruit can be up to 6cm in diameter[200].

tcanta Dye Rootstock WoodUsed as a rootstock for the cultivated apples, there are several named varieties[50]. A yellow dye is obtained from the bark[257]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch. Landscape Uses: Container, Espalier, Specimen.

dwatta Anthelmintic Antibacterial Bach Hypnotic RefrigerantThe bark, and especially the root bark, is anthelmintic, refrigerant and soporific[218, 240]. An infusion is used in the treatment of intermittent, remittent and bilious fevers[240]. The fruit is said to dispel gas, dissolve mucous, cure flux and be a tonic for anaemia, bilious disorders and colic[218]. The leaves contain up to 2.4% of an antibacterial substance called 'phloretin'[240]. This inhibits the growth of a number of gram-positive and gram-negative bacteria in as low a concentration as 30 ppm[240]. The plant is used in Bach flower remedies - the keywords for prescribing it are 'The cleansing remedy', 'Despondency' and 'Despair'[209].

nrakta Europe, including Britain, from Scandinavia south and east to Spain, Greece and S.W. Asia. ksacta Not known in a truly wild situation[74].

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

nwatta An overstory and understory tree (can grow and fruit in some shade). An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[1, 200]. A parent of the cultivated apple[200], it is occasionally cultivated for its edible fruit and also as a dwarfing rootstock[50]. There are some named forms[200]. The fruit is a good wildlife food source, especially for birds[200]. Hybridizes freely with other members of this genus[200]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features:Attracts birds, Not North American native, Attractive flowers or blooms. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2].

4.2.23 Sambucus nigra spp canadensis

American Elder

3 tlin 9 cyuc 4 kcaak 3 tcan 3 dwat 4 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikrip hpa7tli flatprikwis hpa7tmwatli xre7t hjonli

drutta Sambucus nigra spp canadensis is a deciduous Shrub growing to 4 m (13ft) by 4 m (13ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in July, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is

and root pattern is also useful and given here if available. A sprouting standard sending up shoots from the base [1-2]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is suckering with new plants from underground runners away from the plant [2-1].

4.2.19 Pyrus ussuriensis

Harbin Pear, Chinese pear, Ussurian Pear
3 tlin 7 cyuc 4 kcaak 2 tcan 0 dwat 15 m hkuc
hmmihhut cyutli hgattcup hwicli hrasjlutnyikfripr hpa7tli flatprikwlis hpa7tmwatli xre7t hjonli

drutta Pyrus ussuriensis is a deciduous Tree growing to 15 m (49ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in April, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[183]. Size and quality varies tremendously from tree to tree. Good forms have somewhat dry but pleasantly flavoured fruits up to 4cm in diameter, other forms are less pleasant and often smaller[K].

tcanta Rootstock WoodUsed as a rootstock[183] for P. pyrifolia culta in Korea[151], it is very frost resistant[74].

nrakta E. Asia - N.E. China, Korea. ksacta Forests and river valleys in lower mountain zones[74].

propta Seed - best sown in a cold frame as soon as it is ripe in the autumn, it will then usually germinate in mid to late winter. Stored seed requires 8 - 10 weeks cold stratification at 1°C and should be sown as early in the year as possible[200]. Temperatures over 15 - 20°C induce a secondary dormancy in the seed[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for their first year. Plant them out in late spring or early summer of the following year.

nwatta Prefers a good well-drained loam in full sun[200]. Grows well in heavy clay soils. Tolerates light shade but does not fruit so well in such a position. Tolerates atmospheric pollution, excessive moisture and a range of soil types if they are moderately fertile[200]. Established plants are drought tolerant[200]. A very frost resistant tree[74], tolerating temperatures down to below -15°C[200], it is a possible rootstock for northern areas[74]. It is used as a rootstock for P. pyrifolia culta in Korea. This species is a parent of the cultivated Asian pears[200]. Special Features:Not North American native, Blooms are very showy.

4.2.20 Actinidia kolomikta

Kiwi

3 tlin 8 cyuc 4 kcaak 0 tcan 0 dwat 10 m hkuc
hmmihhut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikwlis hpa7tmwatli nyanhjen hjonli

drutta Actinidia kolomikta is a deciduous Climber growing to 10 m (32ft 10in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in June, and the seeds ripen from October to November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Bees, insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit - raw, cooked or dried for later use[1, 3, 105, 183]. Sweet and agreeable[1, 74]. It contains up to 5 times the vitamin C

of blackcurrants[74]. The ovoid fruit is hairless and pale orange when fully ripe and is up to 25mm in diameter[266]. It contains a number of small seeds, but these are easily eaten with the fruit[K]. Young leaves - cooked[105, 177]. Used as a potherb or added to soups[183]. One report suggests the its Content of vitamin C in berries is 1520mg in 100grams of fruit.

nrakta E. Asia - China, Japan, E. Siberia. ksacta Coniferous woodlands and hedges in mountains throughout Japan[58, 126]. Mountain mixed forests in open places at elevations of 1600 - 2900 metres in China[266].

propta Seed - sow spring in a greenhouse[133]. It is probably best if the seed is given 3 months stratification[113], either sow it in a cold frame as soon as it is ripe in November or as soon as it is received. Fresh seed germinates in 2 - 3 months at 10°C, stored seed can take longer[133]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for at least their first winter. When the plants are 30cm or more tall, plant them out into their permanent positions in late spring or early summer, after the last expected frosts[K]. Most seedlings are male[126]. The seedlings are subject to damping off, they must be kept well ventilated[113]. Cuttings of softwood as soon as ready in spring in a frame[K]. Cuttings of half-ripe wood, July/August in a frame. Very high percentage[113]. Cuttings of ripe wood, October/November in a frame.

nwatta Landscape Uses:Arbor. Prefers a sound loamy neutral soil[11, 200]. Succeeds in semi-shade but full sun is best for fruit production[200]. Another report says that the plant prefers semi-shade[160]. Prefers a sheltered position[200]. When grown in a sunny position the leaves normally develop a strong variegation[219]. Prefers a neutral soil, plants become more variegated when they are grown in a limy soil[200]. Very cold resistant, dormant plants are hardy to at least -30°C but new growth in spring can be cut back by late frosts[74, 160, 200]. Plants grow well on a wall and can also be grown into trees[1]. Cats are very fond of this plant and can damage it by scratching it etc[1, 3, 200]. A very ornamental plant[1], there are some named varieties that have been selected for their edible fruit[183, 200]. The form most often cultivated in this country is a male and it is quite possible that all the plants grown here have been developed from a single clone[219]. Often confused with the closely related A. polygama, but it can be distinguished by its leaves which are heart-shaped at the base whilst those of A. polygama are tapered[219]. Fruits are produced on second year wood or on fruit spurs on older wood[126], any pruning is best carried out in the winter[219]. The flowers are sweetly scented[184]. This is a climbing plant, supporting itself by twining around branches etc[200]. Plants in this genus are notably resistant to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required. Special Features:Not North American native, Fragrant flowers, Attractive flowers or blooms. The plant is heat tolerant in zones 12 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. Woody. Growth habit is a single or multiple shooting vine from a crown [1-2]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

4.2.21 Malus prunifolia

Chinese Apple, Plumleaf crab apple
3 tlin 7 cyuc 4 kcaak 0 tcan 0 dwat 8 m hkuc

Marsh Mallow for irritation of mouth and throat and associated dry cough/bronchitis (Root and leaf), mild stomach lining inflammation (root) (see [302] for critics of commission E).

nrakta Central and southern Europe, including Britain, to N. Africa and W. Asia. ksacta The upper margins of salt and brackish marshes, sides of ditches and grassy banks near the sea[7, 17].

propta Seed - sow spring or autumn in a cold frame. The seed is best sown as soon as it is ripe in late summer, the germination is often erratic[238]. Stratification can improve germination rates and time. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer[K]. Division in spring or autumn. Fairly easy, it is best to pot up the divisions in a lightly shaded position in a cold frame or greenhouse until they are growing away well and then plant them out into their permanent positions. Root cuttings in December.

nwatta Succeeds in almost any soil and situation[1, 4, 200], though it prefers a rich moist soil in a sunny position[4, 200]. It also tolerates fairly dry soil conditions[1]. Plants are hardy to about -25°C[187]. Marsh mallow is often cultivated in the herb garden, as a culinary and medicinal herb as well as for ornament[61]. Its roots were at one time the source of the sweet 'marsh mallow', but this sweet is now made without using the plant[4]. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

4.2.8 Secale strictum

Mountain Rye
3 tlin 7 cyuc 5 kcaak 0 tcan 0 dwat 1.2 m hkuc
htut cyutli hgattcup hwicli hrasjlutnyik hpa7tli flatprikwlis hpa7tmwatli xre7t hjonli

drutta Secale strictum is a PERENNIAL growing to 1.2 m (4ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from June to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: Seed - used as a whole grain or ground into a flour and used for making bread etc[46, 177, 183]. Somewhat smaller than the seed of S. cereale but produced abundantly. It is relatively difficult to extract the seed from the glumes by hand[K].

nrakta Europe - Mediterranean to northern Africa and western Asia. ksacta Dry stony or rocky mountain sides.

propta Seed - sow March or October in situ and only just cover the seed. Germination should take place within 2 weeks. If the seed is in short supply, it can be grown in pots in the greenhouse or cold frame in early spring. Only just cover the seed. Prick out the seedlings into individual pots as soon as they are large enough to handle and plant them out in late spring or early summer. Division in spring. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Succeeds in most soils but prefers a well-drained light soil in a sunny position[1]. One report says that it requires protection from severe frosts[1], though our experience is that it is hardy in most parts of the country[K]. Moun-

tain rye is occasionally cultivated for its edible seed[61], it is possibly a parent of the cultivated Rye, S. cereale[57]. This species has an excellent potential as a perennial cereal crop in temperate zones. Although the seed is somewhat smaller than the cultivated annual rye, it is produced abundantly, especially from the second year onwards. The plant tillers well, especially in its second and subsequent years, and the ears in selected varieties can be 25cm long[K]. Not all forms of this species are perennial, the subspecies S. strictum kupri-janovii. Gross. is reliably so[46].

4.2.9 Malva moschata

Musk Mallow
3 tlin 10 cyuc 5 kcaak 2 tcan 2 dwat m hkuc
hmmihhut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikwlis hpa7tmwatli fyfkrre7t hjonli

drutta Malva moschata is a PERENNIAL growing to 0.8 m (2ft 7in) by 0.6 m (2ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

pcista When grown on nitrogen rich soils (and particularly when these are used inorganically), the plant tends to concentrate high levels of nitrates in its leaves[76]. The leaves are perfectly wholesome at all other times.

kcakta Edible Parts: Flowers Leaves SeedEdible Uses: Leaves - raw or cooked[K]. A mild pleasant flavour[K]. The leaves are mucilaginous and fairly bland, we use them in bulk in summer salads[K]. They make a very good perennial substitute for lettuce in a salad, producing fresh leaves from spring until the middle of summer, or until the autumn from spring germinating plants[K]. Flowers - raw[K]. A very decorative addition to the salad bowl, they have a very mild flavour[K]. Seed - raw. Best used before it is fully mature, the seed has a pleasant nutty taste but it is rather small and fiddly to harvest[K].

tcanta Dye FibreCream, yellow and green dyes can be obtained from the plant and the seed heads[168]. A fibre obtained from the stems is used for cordage, textiles and paper making[115].

dwatta Antiphlogistic Astringent Demulcent Diuretic Emollient Expectorant Laxative Poultice Salve UrinaryAll parts of the plant are antiphlogistic, astringent, demulcent, diuretic, emollient, expectorant, laxative, salve[4, 7, 9, 21, 46, 222, 238]. The leaves and flowers can be eaten as part of the diet, or a tea can be made from the leaves, flowers or roots[222]. The leaves and flowers are the main part used, their demulcent properties making them valuable as a poultice for bruise, inflammations, insect bites etc, or taken internally in the treatment of respiratory system diseases or inflammation of the digestive or urinary systems[4, 238]. They have similar properties, but are considered to be inferior; to the common mallow (M. sylvestris) and the marsh mallow (Althaea officinalis) and are seldom used internally[4]. The plant is an excellent laxative for young children[7].

nrakta Most of Europe, including Britain, south to N. Africa. ksacta Grassy places, pastures, hedgebanks etc, especially on rich soils, avoiding acid soils.

propta Seed - best sown in early spring in a cold frame. The seed germinates quickly and easily. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in their permanent positions in the early summer[K]. If you have sufficient seed then it can be sown outdoors in situ in the middle to late spring. Basal cuttings in late spring. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer. Cuttings of side shoots, July/August in a cold frame[111].

nwatta Landscape Uses:Border A very easily grown plant, succeeding in ordinary garden soil[1], though it prefers a reasonably well-drained and moderately fertile soil

in a sunny position[200]. Hardy to about -25°C[187]. A very ornamental plant[1]. It is very variable in form, especially with regard to the degree of laciniation of the leaves[17]. The crushed leaves have a musk-like smell[245]. Plants are generally quite short-lived though they can self-sow freely when in a suitable position and usually more than maintain themselves[233, K]. If the plant is pruned back to the main branches as it comes into flower, then it will produce a fresh flush of leaves in late summer for salad use[K]. A good plant for the summer meadow[24]. Plants seem to be immune to the predations of rabbits[233]. Prone to infestation by rust fungus[200]. Special Features: Attractive foliage, Edible, Fragrant foliage, Not North American native, Naturalizing. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. An evergreen. The plant growth habit is a clumper with limited spread [1-2].

4.2.10 *Secale strictum kuprijanovii*

3 tlin 7 cyuc 5 kcaak 0 tcan 0 dwat 1.2 m hkuc htuc cyutli hgattcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Secale strictum kuprijanovii* is a PERENNIAL growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil and can tolerate drought.

kcakta Edible Parts: Seed Edible Uses: Seed - used as a whole grain or ground into a flour and used for making bread etc[46, 177, 183]. Somewhat smaller than the seed of *S. cereale* but produced abundantly. It is relatively difficult to extract the seed from the glumes by hand[K].

nrakta W. Asia - Caucasia. ksacta Mountain meadows[74].

propta Seed - sow March or October in situ and only just cover the seed. Germination should take place within 2 weeks. If the seed is in short supply, it can be grown in pots in the greenhouse or cold frame in early spring. Only just cover the seed. Prick out the seedlings into individual pots as soon as they are large enough to handle and plant them out in late spring or early summer. Division in spring. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Succeeds in most soils but prefers a well-drained light soil in a sunny position[1]. One report says that it requires protection from severe frosts[1], though our experience is that it is hardy in most parts of the country[K]. Occasionally cultivated for its edible seed[61], it is possibly a parent of the cultivated Rye, *S. cereale*[57]. This species has an excellent potential as a perennial cereal crop in temperate zones. Although the seed is somewhat smaller than the cultivated annual rye, it is produced abundantly, especially from the second year onwards. The plant tillers well, especially in its second and subsequent years, and the ears in selected varieties can be 25cm long[K]. This subspecies is reliably perennial[46].

4.2.11 *Urtica dioica*

Stinging Nettle, California nettle

3 tlin 10 cyuc 5 kcaak 4 tcan 5 dwat 1.2 m hkuc

hmimhtuc cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli nyanhjen hjonli

drutta *Urtica dioica* is a PERENNIAL growing to 1.2 m (4ft) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in leaf from March to November, in flower from May to October, and the seeds ripen from June to October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Wind. The plant is not self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

pcista The leaves of the plants have stinging hairs, causing irritation to the skin[21, 200]. This action is neutralized by heat or by thorough drying, so the cooked leaves are perfectly safe and nutritious[200]. However, only young leaves should be used because older leaves develop gritty particles called cystoliths which act as an irritant to the kidneys[172]. Possible interference with allopathic drugs for diabetes mellitus, hypertension. Central nervous system depression drugs (e.g. morphine, alcohol) may also interact with nettle. Avoid during pregnancy [301].

kcakta Edible Parts: Leaves Oil Edible Uses: Colouring Curdling agent Drink Oil Young leaves - cooked as a potherb and added to soups etc[1, 2, 9, 12, 13, 36, 183]. They can also be dried for winter use[12]. Nettles are a very valuable addition to the diet[244], they are a very nutritious food that is easily digested and is high in minerals (especially iron) and vitamins (especially A and C)[4, 201, 238]. Only use young leaves (see the notes above on toxicity) and wear stout gloves when harvesting them to prevent being stung. Cooking the leaves, or thoroughly drying them, neutralizes the sting, rendering the leaf safe to eat[4, 244]. The young shoots, harvested in the spring when 15 - 20cm long complete with the underground stem are very nice[85]. Old leaves can be laxative[5]. The plants are harvested commercially for extraction of the chlorophyll, which is used as a green colouring agent (E140) in foods and medicines[238]. A tea is made from the dried leaves, it is warming on a winters day[21, 183]. A bland flavour, it can be added as a tonic to China tea[238]. The juice of the leaves, or a decoction of the herb, can be used as a rennet substitute in curdling plant milks[183]. Nettle beer is brewed from the young shoots[200].

tcanta Biomass Compost Dye Fibre Hair Liquid feed Oil Repellent Waterproofing A strong flax-like fibre is obtained from the stems[200]. Used for making string and cloth[1, 4, 6, 13, 36], it also makes a good quality paper[115]. It is harvested as the plant begins to die down in early autumn and is retted before the fibres are extracted[4, 99]. The fibre is produced in less abundance than from flax (*Linum usitatissimum*) and is also more difficult to extract[4]. The plant matter left over after the fibres have been extracted are a good source of biomass and have been used in the manufacture of sugar, starch, protein and ethyl alcohol[4]. An oil obtained from the seeds is used as an illuminant[4]. An essential ingredient of 'QR' herbal compost activator[32]. This is a dried and powdered mixture of several herbs that can be added to a compost heap in order to speed up bacterial activity and thus shorten the time needed to make the compost[K]. The leaves are also an excellent addition to the compost heap[12, 18, 20] and they can be soaked for 7 - 21 days in water to make a very nutritious liquid feed for plants[54]. This liquid feed is both insect repellent and a good foliar feed[14, 18, 53]. The growing plant increases the essential oil content of other nearby plants, thus making them more resistant to insect pests[18, 20, 54]. Although many different species of insects feed on nettles, flies are repelled by the plant so a bunch of freshly cut stems has been used as a repellent in food cupboards[4]. The juice of the plant, or a decoction formed by boiling the herb in a strong solution of salt, will curdle milks and thus acts as a rennet substitute[4]. This same juice, if rubbed into small seams of leaky wooden tubs, will coagulate and make the tub watertight again[4]. A hair wash is made from the infused leaves and this is used as a tonic and antidandruff treatment[172, 201]. A beautiful and permanent green dye is obtained from a decoction of the leaves and stems[4, 115]. A yellow dye is obtained from the root when boiled with alum[4, 115]. A dynamic accumulator gathering minerals or

large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200]. Softwood cuttings from strongly growing plants in spring to early summer in a frame[200]. Layering in spring.

nwatta Requires a well-drained moisture retentive soil[1, 11]. Requires a warm sunny position[11, 159]. Thrives in a loamy soil, doing well on limestone[11]. Prefers some chalk in the soil but apt to become chlorotic if too much is present[1]. A fast-growing and moderately long-lived tree in the wild, producing a heavy fruit crop about once every 4 years[229]. It is cultivated for its timber in C. Europe[50]. This species produces an abundance of flowers and usually fruits well in Britain[11]. In the wild the tree begins to fruit when about 10 years old and then continues for about 100 years, fruiting well in most years[149]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features: Attracts birds, North American native, Naturalizing, All or parts of this plant are poisonous, Attracts butterflies, Fragrant flowers, Attractive flowers or blooms.

4.2.18 *Prunus avium*

Wild Cherry, Sweet cherry

3 tlin 7 cyuc 4 kcaak 4 tcan 2 dwat 18 m hkuc hmimhtuc cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli dyatre7t hjonli

drutta *Prunus avium* is a deciduous Tree growing to 18 m (59ft) by 7 m (23ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from April to May, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is not self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: Fruit Seed Edible Uses: Gum Fruit - raw or cooked[2, 12, 13]. It can be sweet or bitter but it is not acid[11]. The fruit can be cooked in pies etc or used to make preserves. The fruit contains about 78% water; 8.5 - 14% sugars[74]. The fruit is about 20mm in diameter and contains one large seed[200]. Seed - raw or cooked. Do not eat the seed if it is too bitter - see the notes above on toxicity. An edible gum is obtained by wounding the bark[115, 183].

tcanta Dye Gum Tannin Wood Agroforestry Uses: Wild cherry is essentially a pioneer species, and quickly colonises clearings by seeds and suckering, forming secondary woodland, but is often out-competed later by other hardwood species. It is used extensively in Europe for the afforestation of agricultural land and it is also valued for wildlife and amenity plantings[1195]. The flowers are a good source of pollen and nectar for bees[74 , 1145]. This species is a bad companion for potatoes, making them more susceptible to potato blight[201], it also suppresses the growth of wheat[18]. It also grows badly with plum trees, its roots giving out an antagonistic secretion[201]. Other Uses: A green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168]. The bark, especially of the root, contains the dye phlorizin[74]. The wood contains the dye xylan[74]. The seed contains around 30% oil[74]. The bark usually only contains small amounts of tannin, but this sometimes rises to 16%[223]. This species has been utilized to breed cherry cultivars with resistance to frost and a number of diseases. Among cultivated forms there are very

ornamental ones with double and pink flowers, motley or dissected leaves as well as with a drooping crown[1145] The heartwood is pinkish-brown; the sapwood red. The grain is fine and straight, with a satiny texture. The wood is firm, compact, and generally free from defects. A valuable, attractive timber that is easy to work, it is used for turnery, furniture, cabinet making, panelling, musical instruments etc[46 , 74 , 100 , 115 , 1195]. The red sapwood is valued in turnery and woodwork[74].

dwatta Antitussive Astringent Diuretic Tonic The fruit stalks are astringent, diuretic and tonic[4, 7, 238]. A decoction is used in the treatment of cystitis, oedema, bronchial complaints, looseness of the bowels and anaemia[4, 238]. An aromatic resin can be obtained by making small incisions in the trunk[7]. This has been used as an inhalant in the treatment of persistent coughs[7]. Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta Europe, including Britain, from Scandinavia south and east to N. Africa and W. Asia. ksacta Better soils in hedgerows and woods, especially in beech woods[5, 17].

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200]. Softwood cuttings from strongly growing plants in spring to early summer in a frame[200]. Division of suckers in the dormant season[98]. They can be planted out direct into their permanent positions. Layering in spring.

nwatta Landscape Uses:Espalier. Requires a well-drained moisture retentive soil[1, 11]. Succeeds in light shade but fruits better in a sunny position[11, 200]. Thrives in a loamy soil, doing well on limestone[11]. Prefers some chalk in the soil but apt to become chlorotic if too much is present[1]. A very ornamental plant[1], it is fast growing on deep moist soils[11] but is shallow rooting[98]. Trees cast a light shade and are themselves intolerant of heavy shade[186]. They produce quite a lot of suckers and can form thickets, especially if the main trunk is felled[186]. This species is a parent of many cultivated forms of sweet cherries[17, 34], especially the black fruited forms[11]. Where space is at a premium, or at the limits of their climatic range, sweet cherries can be grown against a wall. Most cultivars will grow well against a sunny south or west facing wall though east or north facing walls are not very suitable[219]. The main problems with growing this species against a wall are firstly that it is usually completely self-sterile and so there needs to be space for at least two different cultivars[186], secondly it is very vigorous and so is difficult to keep within bounds[219]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. An excellent tree for insects[24] and the fruit is a good food source for birds. A bad companion for potatoes, making them more susceptible to potato blight[201], it also suppresses the growth of wheat[18]. It also grows badly with plum trees, its roots giving out an antagonistic secretion[201]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features:Edible, Not North American native, All or parts of this plant are poisonous, Fragrant flowers, Attractive flowers or blooms. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit

polish for bamboo and wicker furniture and also for silver[53, 238]. The juice of the plant removes stains from linen[14] and also ink stains (but not ball-point ink) from white material[53, 238]. It is sometimes sold as 'essential salt of lemon'[4]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Anthelmintic Antiscorbatic Astringent Depurative Diuretic Febrifuge Homeopathy Laxative Refrigerant StomachicThe fresh or dried leaves are astringent, diuretic, laxative and refrigerant[4, 7, 14, 21, 238]. They are used to make a cooling drink in the treatment of fevers and are especially useful in the treatment of scurvy[4]. The leaf juice, mixed with fumitory, has been used as a cure for itchy skin and ringworm[4]. An infusion of the root is astringent, diuretic and haemostatic[4, 7, 14, 21, 218]. It has been used in the treatment of jaundice, gravel and kidney stones[4]. Both the roots and the seeds have been used to stem haemorrhages[4]. A paste of the root is applied to set dislocated bones[272]. The plant is depurative and stomachic[7, 14, 21, 218]. A homeopathic remedy is made from the plant[9]. It is used in the treatment of spasms and skin ailments[9].

nrakta Most of Europe, including Britain, temperate Asia, N. America, Greenland. ksacta Meadows, by streams and in open places in woodland[7, 17]. Often found as a weed of acid soils[1].

propta Seed - sow spring in situ. Leaves can be harvested within 8 weeks from sowing. Division in spring. Division is very simple at almost any time of the year, though the plants establish more rapidly in the spring. Use a sharp spade or knife to divide the rootstock, ensuring that there is at least one growth bud on each section of root. Larger divisions can be planted out direct into their permanent positions. We have found it best to put up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Industrial Crop: Biomass Management: Hay Management: Standard Minor Global Crop Staple Crop: Balanced carbA very easily grown and tolerant plant, it succeeds in most soils[37], preferring a moist moderately fertile well-drained soil in a sunny position[200]. Shade tolerant[12]. Established plants are tolerant of considerable neglect, surviving even in dense weed growth[K]. Sorrel has been used since ancient times as a food and medicinal plant[244]. It is still occasionally cultivated for its edible leaves, there are some named varieties[183]. The plant stops producing leaves when it flowers in the summer, regrowing after the seed has set. Plants also usually die down in the winter. Cutting down the flowering stem will encourage the growth of fresh young leaves[4]. 'Blonde de Lyon' has large, only slightly acid leaves and is much less likely to flower than the type[200]. This means that the leaves of this cultivar are often available all through the summer and are often also produced throughout the winter, especially if the winter is mild[200, K]. A food plant for the caterpillars of many species of butterfly, it is a good plant to grow in the spring meadow[24]. Dioecious. Male and female plants must be grown if seed is required. The plant is heat tolerant in zones 6 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2].

4.2.17 Prunus serotina

Rum Cherry - Wild Cherry, Black Cherry, Wild Black Cherry 3 tlin 9 cyuc 4 kcaak 0 tcan 2 dwat 1.8 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Prunus serotina is a deciduous Tree growing to 18 m (59ft) by 8 m (26ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from May to June, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista The seeds and leaves of this species contain high quantities of hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is readily detected by its bitter taste. Usually present in too small a quantity to do any harm, any very bitter seed or fruit should not be eaten[21, 65]. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death. Discard the seeds. Keep plant away from children [301].

kcaakta Edible Parts: Fruit SeedEdible Uses: Condiment DrinkFruit - raw or cooked in pies, jellies, stews etc[2, 11, 34, 55, 62, 101, 149, 183]. It must be fully ripe or else it will have a bitter flavour. The fruit can taste sweet or bitter[43]. The better fruits have a thin skin and a juicy flesh with a pleasant vinous flavour[82]. The fruit can also be used as a flavouring[149]. The taste is best when the plant is grown in a sunny position[159]. The fruit is about 9mm in diameter and contains one large seed[200]. Seed - raw or cooked. Do not eat the seed if it is too bitter - see the notes above on toxicity. An infusion of the twigs is used as a beverage[161, 257]. An extract from the bark is used commercially as a flavouring in soft drinks, sweets, syrups and baked goods[183].

tcanta Dye WoodA green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168]. Wood - close and straight-grained, light, strong, rather hard, highly shock resistant[46, 82, 149, 171, 229]. It bends well, works well, finishes smoothly, glues well, seasons well, shrinks moderately and is moderately free from checking and warping[227]. It weighs about 36lb per cubic foot and takes a beautiful polish[227]. It is widely used for furniture, cabinet making, the interior finish of buildings etc[46, 82, 149, 171, 229].

dwatta Antidiarrhoeal Antitussive Astringent Dysentery Pectoral Sedative Stomachic TonicRum cherry was widely employed medicinally by various native North American Indian tribes who used it to treat a variety of complaints[257]. It is little, if at all, used in modern herbalism. The bark of the root, trunk and branches is antitussive, astringent, pectoral, sedative, stomachic, tonic[4, 21, 95, 165, 238]. The medicinal properties of this plant are destroyed by boiling, so the plant should only be allowed to steep in warm water[213]. The root bark and the aromatic inner bark have expectorant and mild sedative properties and a tea made from either of them has been used to ease pain in the early stages of labour[213, 222]. The tea is also used in the treatment of fevers, colds, sore throats, diarrhoea etc[222, 257]. The bark is harvested in the autumn and should not be stored for longer than one year since it quickly loses its medicinal properties[4, 213]. Young thin bark is preferred[213]. A decoction of the inner bark has been used in the treatment of laryngitis[257]. The root bark has been used as a wash on old sores and ulcers[257]. The bark contains the glycoside prunasin, which is converted in the digestive tract to the highly toxic hydrocyanic acid[222]. Prunasin is at its highest level in the bark in the autumn[222] so the bark is harvested at this time and can be dried for later use[254]. In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238]. The fruit is astringent and has been used in the treatment of dysentery[213].

nrakta N. America - Nova Scotia to Minnesota, south to Florida and Texas. Also in Arizona and Mexico. ksacta Found in a variety of soils, preferring moist fertile conditions on north or east facing slopes or protected coves[229]. Dry woods[43].

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are

nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Antiasthmatic Antidandruff Antirheumatic Antiseborrheic Astringent Diuretic Eczema Galatogogue Haemostatic Hypoglycaemic Stings Tonic UrinaryNettles have a long history of use in the home as a herbal remedy and nutritious addition to the diet[K]. A tea made from the leaves has traditionally been used as a cleansing tonic and blood purifier so the plant is often used in the treatment of hay fever, arthritis, anaemia etc[254]. The whole plant is antiasthmatic, antidandruff, astringent, depurative, diuretic, galatogogue, haemostatic, hypoglycaemic and a stimulating tonic[4, 9, 21, 36, 165, 238]. An infusion of the plant is very valuable in stemming internal bleeding[4], it is also used to treat anaemia, excessive menstruation, haemorrhoids, arthritis, rheumatism and skin complaints, especially eczema[238]. Externally, the plant is used to treat skin complaints, arthritic pain, gout, sciatica, neuralgia, haemorrhoids, hair problems etc[238]. The fresh leaves of nettles have been rubbed or beaten onto the skin in the treatment of rheumatism etc[257]. This practice, called urtification, causes intense irritation to the skin as it is stung by the nettles. It is believed that this treatment works in two ways. Firstly, it acts as a counter-irritant, bringing more blood to the area to help remove the toxins that cause rheumatism. Secondly, the formic acid from the nettles is believed to have a beneficial effect upon the rheumatic joints. For medicinal purposes, the plant is best harvested in May or June as it is coming into flower and dried for later use[4, 238]. This species merits further study for possible uses against kidney and urinary system ailments[222]. The juice of the nettle can be used as an antidote to stings from the leaves and an infusion of the fresh leaves is healing and soothing as a lotion for burns[4]. The root has been shown to have a beneficial effect upon enlarged prostate glands[254]. A homeopathic remedy is made from the leaves[4]. It is used in the treatment of rheumatic gout, nettle rash and chickenpox, externally is applied to bruises[4]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve *Urtica dioica* Stinging Nettle for rheumatic ailments (internal use of leaf), irrigation therapy, for inflammatory disease of the lower urinary tract and prevention of kidney 'gravel' formation, urination difficulty from benign prostatic hyperplasia (root) (see [302] for critics of commission E).

nrakta Temperate regions throughout the world, including Britain. The plant has become naturalized at higher elevations in the Tropics. ksacta Waste ground, hedgerows, woods etc, preferring a rich soil and avoiding acid soils[4, 9].

propta Seed - sow spring in a cold frame, only just covering the seed. Prick out the seedlings into individual pots when they are large enough to handle, and plant them out in the summer. Division succeeds at almost any time in the growing season. Very easy, plant them straight out into their permanent positions.

nwatta Industrial Crop: Fiber Management: Hay Regional Crop Staple Crop: ProteinPrefers a soil rich in phosphates and nitrogen. Plants must be grown in a deep rich soil if good quality fibre is required[4, 115]. Nettles are one of the most undervalued of economic plants. They have a wide range of uses, for food, medicines, fibres etc and are also a very important plant for wildlife. There are at least 30 species of insects that feed on it and the caterpillars of several lepidoptera species are dependant upon it for food[30]. Especially when growing in rich soils, the plant can spread vigorously and is very difficult to eradicate. It is said that cutting the plant down three times a year for three years will kill it[4]. It is a good companion plant to grow in the orchard and amongst soft fruit[53, 54]. So long as it is not allowed to totally over-run the plants, it seems to improve the health of soft fruit that grows nearby and also to protect the fruit from birds, but it makes harvesting very difficult. Dioecious. Male and female plants must be grown if seed is required. The plant is heat tolerant in zones 10 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat

Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

4.2.12 Secale hybrids

Perennial cereal rye 3 tlin 9 cyuc 5 kcaak 4 tcan 1 dwat 1.8 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli hjonli

drutta Secale hybrids is a PERENNIAL growing to 1.8 m (6ft) by 0.3 m (1ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcaakta Edible Parts: Oil SeedEdible Uses: OilCarbon Farming Solutions - Staple Crop: balanced carb (The term staple crop typically refers to a food that is eaten routinely and accounts for a dominant part of people's diets in a particular region of the world) [1-1]. A minor or regional perennial crop in production with low or unreported yields [1-1]. Perennial hybrids are now under development. Wild perennial species found in Turkey , for example, *Secale monatum* Guss var. *anatolicum* Boiss and *Secale montanum* Guss var. *vavilovi* Grossh. have a larger stature, high frost resistance, strong tillering ability, and tolerance to poor soils and drought. Understanding wild plant species is becoming important in the development of new hybrid crops.

tcanta OilMany including Biomass; Green manure; Oil; Soil stabilization; and Thatching.

dwatta Possible. For example *Secale cereale* seed is made into a poultice and applied to tumours[218]. The seed is also an effective laxative due to its fibrous seed coat[269].

nrakta Origin: recent hybrid origin. ksacta Hybrid propta Seed. Division.

nwatta Management: Standard Staple Crop: Balanced carb Under DevelopmentClimate: boreal to warm temperate, Mediterranean. Humidity: semi-arid to humid. Carbon Farming Solutions - Cultivation: under development perennial hybrids. Management: standard (Describes the non-destructive management systems that are used in cultivation) [1-1].

4.2.13 Lepidium spp.

Perennial Lepidium 3 tlin 10 cyuc 5 kcaak 0 tcan 3 dwat 1.2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli hjonli

drutta Lepidium spp. is a PERENNIAL growing to 1.2 m (4ft) by 2 m (6ft 7in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcaakta Edible Parts: Leaves RootEdible Uses: Carbon Farming Solutions - Staple Crop: oil (The term staple crop typically refers to a food that is eaten routinely and accounts for a dominant part of people's diets in a particular region of the world) [1-1]. Fruit is usually spreading and squat (less than 3 times as long as broad).

tcanta See individual species. dwatta Various medicinal qualities depending on the species.

nrakta Origin: N. Temperate. Widely distributed in the Americas, Africa, Asia, Europe, and Australia. ksacta Various depending on the species.

propta See individual species.

nwatta Management: Standard Staple Crop: Oil Under DevelopmentClimate: boreal to warm temperate. Humidity: semi-arid to humid. A genus of plants in the mustard/cabbage family, Brassicaceae. Annual to perennial, herbs or shrubs. Species include garden cress, maca, and dittander. Lepidium is from the Greek lepis (scale) referring to the shape of the seed pods. Carbon Farming Solutions - Cultivation: under development. Management: standard (Describes the non-destructive management systems that are used in cultivation) [1-1].

4.2.14 Foeniculum vulgare

Fennel, Sweet fennel

3 tin 10 cyuc 5 kcaak 4 tcan 3 dwat 1.5 m hkuc htut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatprkkl-wis hpa7tmwatli fyfxre7t hjonli

drutta Foeniculum vulgare is an evergreen Perennial growing to 1.5 m (5ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf all year, in flower from August to October, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure.

pcista Skin contact with the sap or essential oil is said to cause photo-sensitivity and/or dermatitis in some people[218, 222]. Ingestion of the oil can cause vomiting, seizures and pulmonary oedema[222]. Avoid for small children. Avoid if cirrhosis/liver disorders. Diabetics check sugar content of preparation [301].

kcaakta Edible Parts: Flowers Leaves Oil Root Seed StemEdible Uses: Condiment Drink Oil TeaLeaves - raw or cooked[2, 4, 5, 9, 27]. A delicious aniseed flavour[183], the young leaves are best since older ones soon become tough[K]. They are often used as a garnish on raw or cooked dishes and make a very pleasant addition to salads[183]. They help to improve digestion and so are particularly useful with oily foods[244]. The leaves are difficult to store dried[200], though this does not really matter since they can often be harvested all year round, especially if the plants are in a warm, sheltered position[K]. Leaf stalks and flower heads - raw or cooked[14, 37, 52, 183]. A similar aniseed flavour to the leaves[K]. The aromatic seeds are used as a flavouring in cakes, bread, stuffings etc[2, 4, 5, 21, 27, 183]. They have a similar flavour to the leaves[K] and also improve the digestion[244]. The sprouted seeds can be added to salads[183]. An essential oil from the fully ripened and dried seed is used as a food flavouring in similar ways to the whole seed[1, 46, 183, 245]. Root - cooked[53]. Somewhat parsnip-like. The leaves or the seeds can be used to make a pleasant-tasting herbal tea[16, 183].

tcanta Dye Essential Oil Repellent StrewingThe seed yields up to 5% of an essential oil[1, 4, 46]. This is used medicinally, as a food flavouring, in toothpastes, soaps, perfumery, air fresheners etc[1, 46, 238]. The flavour of fennel oil depends upon its two main constituents. 'Fencheon' is a bitter tasting element whilst 'anethole' has a sweet anise-like flavour[238]. The proportions of these two ingredients varies according to strain and region. Plants growing in the Mediterranean and southern Europe usually have a sweet oil whilst plants growing in central and northern Europe usually produce a more bitter oil[238]. The quality of the oil also depends upon how well the seed has been dried - the oil from fully ripened and dried seeds being much sweeter and more fragrant[245]. The dried plant is an insect repellent[14, 53], the crushed leaves are effective for keeping dogs free of fleas[201]. The plant was formerly used as a strewing herb[201]. Yellow and brown dyes are obtained from the flowers and leaves combined[168].

dwatta Analgesic Antiinflammatory Antispasmodic Aromatherapy Aromatic Carminative Diuretic Emmenagogue Expectorant Galactagogue Hallucinogenic Stimulant Stomachic UrinaryFennel has a long history of herbal use and is a commonly used household remedy, being useful in the treatment of a variety of complaints, especially those of the

digestive system[244]. The seeds, leaves and roots can be used, but the seeds are most active medicinally and are the part normally used[4]. An essential oil is often extracted from the fully ripened and dried seed for medicinal use, though it should not be given to pregnant women[4, 238]. The plant is analgesic, anti-inflammatory, antispasmodic, aromatic, carminative, diuretic, emmenagogue, expectorant, galactagogue, hallucinogenic, laxative, stimulant and stomachic[4, 7, 9, 21, 147, 165, 176, 192, 238]. An infusion is used in the treatment of indigestion, abdominal distension, stomach pains etc[254]. It helps in the treatment of kidney stones and, when combined with a urinary disinfectant like Arctostaphylos uva-ursi, makes an effective treatment for cystitis[254]. It can also be used as a gargle for sore throats and as an eyewash for sore eyes and conjunctivitis[254]. Fennel is often added to purgatives in order to allay their tendency to cause gripe, and also to improve the flavour[4]. An infusion of the seeds is a safe and effective cure for wind in babies[244]. An infusion of the root is used to treat urinary disorders[238]. An essential oil obtained from the seed is used in aromatherapy. Its keyword is 'Normalising'[210]. The essential oil is bactericidal, carminative and stimulant[218]. Some caution is advised, see notes above on toxicity[222]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Foeniculum vulgare for cough, bronchitis, dyspeptic complaints (see [302] for critics of commission E).

nrakta S. Europe. Naturalized in Britain. ksacta Found most often in dry stony calcareous soils near the sea[1, 16, 190].

propta Seed - best sown in early spring in situ[1]. The seed can also be sown in situ in the autumn[4, 37]. In many gardens it self sows freely. Division in March as the new growth appears[16, 200]. The plants are very tolerant of disturbance, we have found divisions to take well at any time of the year, though these divisions are never as good as seed-sown plants[K].

nwatta An easily grown plant, it succeeds in most soils but prefers a sunny dry position[4, 16, 37, 200]. It grows well in sandy soils[188] and is drought tolerant once established[190]. Plants often self-sow freely in the garden[K]. Plants can be grown in quite coarse grass, which can be cut annually in the autumn[233]. Although hardy in most parts of Britain, plants are liable to die out over the winter if the soil is not well-drained or the weather is persistently cold and wet[238]. Fennel is often cultivated in the herb garden for its edible and medicinal uses, there are some named varieties[183]. Especially in mild winters, the leaves can be available all year round[K]. It is best to cut a few plants back to ground level occasionally during the growing season, thus ensuring a constant supply of fresh young shoots[4]. In a dry summer make sure that you water the cut-down clump or it might not regrow that year[K]. Fennel is also grown commercially as a medicinal plant and for its essential oil[4, 238]. Fennel is in general a poor companion plant in the garden. It inhibits the growth of nearby plants, especially beans, tomatoes and kohlrabi[14, 18]. It is itself inhibited by wormwood and coriander[14, 18]. However, the flowering plant attracts beneficial insects such as bees, parasitic wasps, tachinid flies and hoverflies to the garden. The presence of these creatures will help to maintain a natural balance of insects in the garden and help prevent infestations by aphids etc[238]. It is best not to grow fennel and dill (Anethum graveolens) close to each other since hybridisation can occur and the resulting seedlings will be of indeterminate flavour[238]. The plant is heat tolerant in zones 9 through 6. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2].

4.2.15 Camassia quamash

Quamash, Small camas, Utah small camas, Walpole's small camas

3 tin 7 cyuc 5 kcaak 3 tcan 1 dwat 0.3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprkkl-wis hpa7tmwatli xre7t hjonli

drutta Camassia quamash is a BULB growing to 0.3 m (1ft) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from May to June, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcaakta Edible Parts: RootEdible Uses: Bulb - raw or cooked[62, 95]. The bulb, which can be up to 5cm in diameter[270], has a mild, starchy flavour when eaten raw, but a gummy texture that reduces the enjoyment of it somewhat[K]. When cooked, however, it develops a delicious sweet flavour somewhat like sweet chestnuts[92], and is a highly nutritious food[2]. Excellent when slow baked, it can also be dried and made into a powder which can be used as a thickener in stews or mixed with cereal flours when making bread, cakes etc[K]. The bulbs can be boiled down to make a molasses, this was used on festival occasions by various Indian tribes[2, 183]. The bulbs can be harvested at any time of the year[85], but are probably best in early summer when the seeds are ripe[94]. One report says that the bulbs contain inulin (a starch that cannot be digested by humans) but that this breaks down when the bulb is cooked slowly to form the sugar fructose which is sweet and easily digested[256]. Quamash bulbs were a staple food of the N. American Indians[42, 92]. The tribes would move to the Quamash fields in the early autumn and, whilst some people harvested the bulbs, others would dig a pit, line it with boulders then fill it with wood and set fire to it. The fire would heat the boulders and the harvested bulbs would then be placed in the pit and the whole thing covered with earth and the bulbs left to cook slowly for 2 days. The pit would then be opened and the Indians would feast on the bulbs until they could no longer fit any more in their stomachs. Whatever was left would be dried and stored for winter use.

tcanta Notable Products: Nectar, pollen, edible bulb. Attracts Wildlife - flowers attract beneficial insects. Grown as an ornamental plant.

dwatta Birthing aid OxytoxicA decoction of the roots has been used to induce labour[257]. An infusion of the leaves has been used to treat vaginal bleeding after birth and to help expel the placenta[257].

nrakta Western N. America - Washington to California, east to Montana and Utah. ksacta Coastal mountain forests and wet meadows inland[60, 62]. Marshy meadows in coniferous forest, to 2300 metres[90].

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

nwatta Succeeds in almost any soil[42]. Grows well in heavy clay soils. Prefers a rather heavy loam[1] that has plenty of moisture in spring but does not remain wet over the winter[138, 200]. Dislikes dry soils[200]. Prefers full sun but tolerates partial shade[138, 200]. The dormant bulbs are very hardy and will withstand soil temperatures down to at least -10°C[214]. Quamash is a very pretty flowering bulb that has quite a large potential as an edible ornamental plant[K]. It grows very well in the flower border but can also be naturalised in damp grass[134]. We are intending to grow it in a grassed-down orchard in our Cornish trial ground. The bulbs flower in late spring and early summer and have completely died down by early July so they do not

interfere with harvesting the apple crop. The grass in the orchard will be cut in early spring before the quamash comes into growth, but will not be cut again until July. The bulbs will be harvested at any time from July to December and, since it is impossible to find all the bulbs, it is hoped that those remaining will be able to increase and supply bulbs for future years[K]. A polymorphic and very ornamental plant[1], there are some named varieties[200]. The subspecies C. quamash maxima has larger bulbs than the type, up to 65mm in diameter[270]. A good bee plant[108]. This species can be confused with certain poisonous bulbs in the genus Ziganus[85]. Plant the bulbs 7 - 10cm deep in early autumn and then leave undisturbed[1]. The plant is heat tolerant in zones 12 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. Ephemeral emerging in spring and dying back by summer every year [1-2]. The root pattern is a bulb.

4.2.16 Rumex acetosa

Sorrel, Garden sorrel

3 tin 7 cyuc 5 kcaak 4 tcan 3 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatprkkl-wis hpa7tmwatli nyanhjen hjonli

drutta Rumex acetosa is a PERENNIAL growing to 0.6 m (2ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in leaf all year, in flower from May to June, and the seeds ripen from June to August. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Wind. The plant is not self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Plants can contain quite high levels of oxalic acid, which is what gives the leaves of many members of this genus an acid-lemon flavour. Perfectly alright in small quantities, the leaves should not be eaten in large amounts since the oxalic acid can lock-up other nutrients in the food, especially calcium, thus causing mineral deficiencies. The oxalic acid content will be reduced if the plant is cooked. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcaakta Edible Parts: Flowers Leaves Root SeedEdible Uses: Curdling agentLeaves - raw or cooked[2, 4, 5, 7, 13, 27]. They make a thirst-quenching on their own, or can be added to salads, used as a potherb or pureed and used in soups[183]. A delicious lemon-like flavour, liked by most people who try them, they can be rather overpowering in quantity and are more generally used as a flavouring in mixed salads[K]. The leaves can also be dried for later use[12]. The leaves can be available all through the winter, especially in mild weather or if a little protection is given to the plants[K]. The leaves should be used sparingly in the diet[9, 21], see the notes on toxicity above. Flowers - cooked as a vegetable or used as a garnish[183]. Root - cooked. It is dried, ground into a powder and made into noodles[105]. Seed - raw or cooked[172]. Ground into a powder and mixed with other flours to make bread[163]. The seed is easy to harvest, but is rather small and fiddly to use[K]. The juice of the leaves can be used as a curdling agent for milks[4, 183].

tcanta Cleanser Dye PolishDark green to brown and dark grey dyes can be obtained from the roots, they do not need a mordant[168]. A grey-blue dye is obtained from the leaves and stems[106]. An infusion of the stems is used as a

soups etc[7, 9]. The leaves are best used as they come into growth in the spring[9]. The flowering stem, including the buds, is cooked and served like asparagus[183].

tcanta CosmeticAn infusion of the petals is used to clear the skin and lighten freckles[7]. A distilled water made from the plant is used in cleansing lotions for dry skins[7].

dwatta Astringent Depurative Diuretic Expectorant StomachicGoat's beard is considered to be a useful remedy for the liver and gallbladder[254]. It appears to have a detoxifying effect and may stimulate the appetite and digestion. Its high inulin content makes this herb a useful food for diabetics since inulin is a nutrient made of fructose rather than glucose units and therefore does not raise blood sugar levels[254]. The root is astringent, depurative, diuretic, expectorant, nutritive and stomachic[7, 21]. A syrup made from the root gives great relief in cases of obstinate coughs and bronchitis[7]. A decoction of the root is given in the treatment of heartburn, loss of appetite and disorders of the breast or liver[240]. The root is harvested in the autumn and dried for later use[7]. The fresh juice of young plants is said to be a good dissolver of bile, relieving the stomach without side effects[4].

nrakta Europe, including Britain, from Scandinavia south and east to Spain, Caucasus, Siberia, Iran. ksacta Meadows, pastures, dunes, waysides and waste places[17].

propta Seed - sow spring in situ. Make sure to water the seed in if the weather is dry.

nwatta Succeeds in ordinary garden soils, including heavy clays[200]. Goat's beard was formerly cultivated as a vegetable, though it has now fallen into disuse[2, 4]. Grows well in the summer meadow[24]. The flowers open at day-break and close before noon[4].

4.2.97 *Mentha x piperita officinalis*

White Peppermint

3 tlin 7 cyuc 3 kcaak 3 tcan 5 dwat 0.5 m hkuc hmimhtut cyutiI tcup hwicli hrasjlutnyikfriip hpa7tli flatprikI-wis hpa7tmwatli xre7t hjonli

drutta *Mentha x piperita officinalis* is a PERENNIAL growing to 0.5 m (1ft 8in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista In large quantities this plant, especially in the form of the extracted essential oil, can cause abortions so should not be used by pregnant women.

kcakta Edible Parts: LeavesEdible Uses: Condiment TeaLeaves - raw or cooked. A mild peppermint flavour, they are used as a flavouring in salads or cooked foods[183]. An essential oil from the leaves and flowers is used as a flavouring in sweets, chewing gum, ice cream etc[183]. A herb tea is made from the fresh or dried leaves[183].

tcanta Essential Repellent StrewingAn essential oil obtained from the whole plant is used in perfumery[46, 105]. It is also an ingredient of oral hygiene preparations, toiletries etc[238]. Peppermint leaves are used as an ingredient of pot-pourri[238]. It was formerly used as a strewing herb[14] The plant repels insects, rats etc[14, 18, 20]. Rats and mice intensely dislike the smell of mint. The plant was therefore used in homes as a strewing herb and has also been spread in granaries to keep the rodents off the grain[244]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch. Dynamic accumulator.

dwatta Anodyne Antiseptic Antispasmodic Aromatherapy Carminative Cholagogue Diaphoretic Refrigerant Stomachic Tonic VasodilatorWhite peppermint is a very important and commonly used remedy, being employed by allopathic doctors as well as herbalists[9]. It is also widely used as a domestic remedy. This cultivar is considered to be milder acting than black peppermint (*Mentha x piperita vulgaris*). A tea made from the leaves has traditionally been used in the treatment of fevers, headaches, digestive disorders (especially flatulence) and various minor ailments[222, 238]. The herb is

abortifacient, anodyne, antiseptic, antispasmodic, carminative, cholagogue, diaphoretic, refrigerant, stomachic, tonic and vasodilator[4, 9, 21, 165, 238]. An infusion is used in the treatment of irritable bowel syndrome, digestive problems, spastic colon etc[254]. Externally a lotion is applied to the skin to relieve pain and reduce sensitivity[254]. The leaves and stems can be used fresh or dried, they are harvested for drying in August as the flowers start to open[4]. The essential oil in the leaves is antiseptic and strongly antibacterial, though it is toxic in large doses[222, 254]. When diluted it can be used as an inhalant and chest rub for respiratory infections[254]. The essential oil is used in aromatherapy. Its keyword is 'Cooling'[210].

nrakta Britain. ksacta A natural hybrid, *M. aquatica x M. spicata* found in moist soils.

propta Seed - sow spring in a cold frame. Germination is usually fairly quick. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. *Mentha* species are very prone to hybridisation and so the seed cannot be relied on to breed true. Even without hybridisation, seedlings will not be uniform and so the content of medicinal oils etc will vary. When growing plants with a particular aroma it is best to propagate them by division[K]. Division can be easily carried out at almost any time of the year, though it is probably best done in the spring or autumn to allow the plant to establish more quickly. Virtually any part of the root is capable of growing into a new plant. Larger divisions can be planted out direct into their permanent positions. However, for maximum increase it is possible to divide the roots up into sections no more than 3cm long and pot these up in light shade in a cold frame. They will quickly become established and can be planted out in the summer.

nwatta Succeeds in most soils and situations so long as the soil is not too dry[1, 200]. Grows well in heavy clay soils. A sunny position is best for the production of essential oils, but the plant also succeeds in partial shade. Prefers a slightly acid soil[16]. Often grown in the herb garden and also commercially for its essential oil. The whole plant has a pleasant aroma of peppermint. Most mints have fairly aggressive spreading roots and, unless you have the space to let them roam, they need to be restrained by some means such as planting them in containers that are buried in the soil[K]. Hybridizes freely with other members of this genus. The flowers are very attractive to bees and butterflies[24]. A good companion for growing near cabbages and tomatoes, helping to keep them free of insect pests[14, 20]. Produces a better quality essential oil if the plant is grown in dry ground[115]. Members of this genus are rarely if ever troubled by browsing deer[233]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2].

4.2.98 *Fragaria virginiana*

Scarlet Strawberry, Virginia strawberry

3 tlin 7 cyuc 3 kcaak 2 tcan 2 dwat 0.3 m hkuc hmimhtut cyutiI tcup hwicli hrasjlutnyik hpa7tli flatprikI-wis hpa7tmwatli xre7t hjonli

drutta *Fragaria virginiana* is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from April to May, and the seeds ripen from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: TeaFruit - raw, cooked or made into preserves[2, 27, 101, 183]. Sweet and succulent. Small but delicious[159]. The fruit is up to 20mm in diameter[200]. The dried leaves are a very pleasant tea substitute[55, 62, 183]. Rich in vitamin C[159].

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

4.2.42 *Brassica oleracea botrytis*

Cauliflower

3 tlin 10 cyuc 4 kcaak 3 tcan 0 dwat 0.8 m hkuc hmimhtut cyutiI tcup hwicli hrasjlutnyikfriip hpa7tli flatprikI-wis hpa7tmwatli fyifxre7t hjonli

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

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

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

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

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

nwatta Succeeds in full sun in a well-drained moisture-retentive fertile soil with plenty of lime[37, 200, 264]. Cauliflowers, especially the winter and spring maturing types, should not be given a soil that is too rich in nitrogen since this can encourage soft, sappy growth that is more susceptible to winter cold damage[264]. Prefers a heavy soil[16]. Requires a warm sunny position[16]. Prefers a pH in the range 6 to 7[200], though it tolerates a pH in the range

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

4.2.43 *Prunus pumila*

Dwarf American Cherry, Sandcherry, Western sandcherry, Eastern sandcherry, Great Lakes sandcherry
3 tlin 8 cyuc 4 kcaak 2 tcan 1 dwat 0.6 m hkuc htut cyutiI hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatprikI-wis hpa7tmwatli fyifxre7t hjonli

drutta *Prunus pumila* is a deciduous Shrub growing to 0.6 m (2ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 2. It is in flower in May, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure.

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: Fruit SeedEdible Uses: Fruit - raw or cooked[2, 159, 161]. A reasonable size, up to 10mm in diameter with one large seed[200], this is the largest of the N. American cherries[213]. A rich and pleasantly acid taste when fully ripe though they are sometimes slightly bitter[2, 11, 101, 183]. Eaten out of hand, used in preserves or dried for later use[183]. Seed - raw or cooked. Do not eat the seed if it is too bitter - see the notes above on toxicity.

tcanta Dye RootstockA green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168]. Used as a rootstock for the sour cherry[160].

dwatta Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta Eastern N. America - New Brunswick to Manitoba, Maine, New Jersey, Indiana and Wisconsin. ksacta Dunes and sand, or on calcareous rocky shores[43].

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are

large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200]. Softwood cuttings from strongly growing plants in spring to early summer in a frame[200]. Layering in spring.

nwatta Requires a well-drained moisture retentive soil[1, 11]. Thrives in a loamy soil, doing well on limestone[11]. Prefers some chalk in the soil but apt to become chlorotic if too much is present[1]. Requires a sunny position[11]. Established plants are very drought resistant[160]. This species is hardy to about -35°C when the plants are fully dormant[160], though the young growth in spring is fairly tender[K]. Plants are susceptible to mildew in low areas[160]. Plants thrive in areas with a short growing season[160]. The fruits are highly resistant to all fruit worms[160]. Plants can produce fruit in 3 years from seed[160]. A single plant, growing at Hilliers Arboretum in 1999, produced a good crop of fruit with viable seed, so the species is almost certainly self-fertile[K]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. Plants in this genus are notably susceptible to honey fungus[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2].

4.2.44 *Mentha x piperita vulgaris*

Black Peppermint

3 tin 7 cyuc 4 kcaak 3 tcan 5 dwat 0.5 m hku
hmmihtut cyuti tcup hwicli hrasljutnyikfrip hpa7ti flatprikliw hpa7tmwatli xre7t hjonli

drutta *Mentha x piperita vulgaris* is a PERENNIAL growing to 0.5 m (1ft 8in) by 1 m (3ft 3in). See above for USDA hardness. It is hardy to UK zone 3 and is not frost tender. It is in flower from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista In large quantities this plant, especially in the form of the extracted essential oil, can cause abortions so should not be used by pregnant women.

kcakta Edible Parts: LeavesEdible Uses: Condiment TeaLeaves - raw or cooked. A strong peppermint flavour, they are used as a flavouring in salads or cooked foods[2, 27, 105]. This plant should not be used by pregnant women, see the notes above on toxicity. An essential oil from the leaves and flowers is used as a flavouring in sweets, chewing gum, ice cream etc[183]. A herb tea is made from the fresh or dried leaves[21, 183].

tcanta Essential Repellent StrewingAn essential oil is obtained from the whole plant. It is used medicinally and as a food flavouring[2, 46, 57]. It is also an ingredient of oral hygiene preparations, toiletries etc[238]. Peppermint leaves are used as an ingredient of pot-pouri[238]. They were formerly used as a strewing herb[14]. The plant repels insects, rats etc[14, 18, 20]. Rats and mice intensely dislike the smell of mint. The plant was therefore used in homes as a strewing herb and has also been spread in granaries to keep the rodents off the grain[244]. Dynamic accumulator.

dwatta Abortifacient Anodyne Antiseptic Antispasmodic Aromatherapy Carminative Chologogue Diaphoretic Refrigerant Stomachic Tonic VasodilatorBlack Peppermint is a very important and commonly used herbal remedy, being employed by allopathic doctors as well as herbalists[9]. It is also widely used as a domestic remedy. This cultivar is considered to be stronger acting than white peppermint (*Mentha x piperita officinalis*). A tea made from the leaves has traditionally been used in the treatment of fevers, headaches, digestive disorders (especially flatulence) and various minor ailments[222, 238]. The herb is abortifacient, anodyne, antiseptic, antispasmodic, carminative, diaphagogue, diaphoretic, refrigerant, stomachic, tonic and vasodilator[4, 9, 21, 165, 238]. An infusion is used in the treatment of irritable bowel

syndrome, digestive problems, spastic colon etc[254]. Externally a lotion is applied to the skin to relieve pain and reduce sensitivity[254]. The leaves and stems can be used fresh or dried, they are harvested for drying in August as the flowers start to open[4]. The essential oil in the leaves is antiseptic and strongly antibacterial, though it is toxic in large doses[222, 254]. When diluted it can be used as an inhalant and chest rub for respiratory infections[254]. The essential oil is used in aromatherapy. Its keyword is 'Cooling'[210].

nraakta Britain. ksacta A natural hybrid, M. aquatica x M. spicata, found in moist soils in ditches, waste places etc[9].

propta Seed - sow spring in a cold frame. Germination is usually fairly quick. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. *Mentha* species are very prone to hybridisation and so the seed cannot be relied on to breed true. Even without hybridisation, seedlings will not be uniform and so the content of medicinal oils etc will vary. When growing plants with a particular aroma it is best to propagate them by division[K]. Division can be easily carried out at almost any time of the year, though it is probably best done in the spring or autumn to allow the plant to establish more quickly. Virtually any part of the root is capable of growing into a new plant. Larger divisions can be planted out direct into their permanent positions. However, for maximum increase it is possible to divide the roots up into sections no more than 3cm long and pot these up in light shade in a cold frame. They will quickly become established and can be planted out in the summer.

nwatta Succeeds in most soils and situations so long as the soil is not too dry[1, 200]. Grows well in heavy clay soils. A sunny position is best for the production of essential oils, but plants also succeed in partial shade. Prefers a slightly acid soil[16]. A commonly grown herb[4], it is often cultivated commercially for its essential oil[61]. This is the black form of peppermint and it is said to produce a superior essential oil, making it the preferred choice as a food flavouring and for medicinal purposes. The oil is of better quality when the plant is grown on dry soils[115]. Most mints have fairly aggressive spreading roots and, unless you have the space to let them roam, they need to be restrained by some means such as planting them in containers that are buried in the soil[K]. Hybridizes freely with other members of this genus. The flowers are very attractive to bees and butterflies[24]. A good companion for growing near cabbages and tomatoes, helping to keep them free of insect pests[20]. Members of this genus are rarely if ever troubled by browsing deer[233].

4.2.45 *Carum carvi*

Caraway

3 tin 9 cyuc 4 kcaak 3 tcan 3 dwat 0.6 m hku
hmmihtut cyuti tcup hwicli hrasljutnyik hpa7ti flatprikliw hpa7tmwatli fyifxre7t hjonli

drutta *Carum carvi* is a BIENNIAL growing to 0.6 m (2ft) by 0.3 m (1ft in). It is not frost tender. It is in flower from June to July, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Caraway is said to contain the alleged 'psychotroph' myristicine[218]. Excessive intake can lead to kidney and liver damage [301]

kcakta Edible Parts: Leaves Root SeedEdible Uses: Condiment TeaSeed - raw or cooked. A spicy flavour, it is used as a flavouring in confectionery and bread, also as a flavouring in salads, vegetables etc[2, 4, 5, 9, 18, 20, 27, 183]. It is high in protein and fat[14]. The seed is often chewed after a meal in order to sweeten the breath and also to relieve heartburn after a rich meal[244]. Per 100g, the seed contains 333 calories, 10g water, 20g protein, 14.5g fat, 50g carbohydrate, 12.5g fibre, 6g ash, 689mg calcium, 568mg phosphorus, 16.2mg iron, 258mg magnesium, 17mg sodium, 1351mg potassium, 5.5mg zinc, 363 IU vitamin A, 0.383mg thiamine, 0.379mg riboflavin, 3.61mg niacin[218]. An essential oil from the seed is used as a flavouring in ice creams, candy, soft drinks etc[183, 238]. It is an essential ingredient of the liqueur kummel[244]. Root - cooked[183].

August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been made for this species, there have been reports that some members of this genus can cause photosensitivity in susceptible people. Many species also contain oxalic acid (the distinctive lemony flavour of sorrel) - whilst not toxic this substance can bind up other minerals making them unavailable to the body and leading to mineral deficiency. Having said that, a number of common foods such as sorrel and rhubarb contain oxalic acid and the leaves of most members of this genus are nutritious and beneficial to eat in moderate quantities. Cooking the leaves will reduce their content of oxalic acid. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Edible Parts: Leaves Root SeedEdible Uses: Leaves - raw or cooked[62, 172]. They have a pleasant tart taste when cooked[85]. Seed - raw or cooked[172]. The seed is not often produced and even when it is, it is rather small and fiddly to utilize. It is rich in starch[91]. It is pickled in Nepal[272]. Root - raw or cooked[2, 61, 62, 91]. Starchy and pleasant but rather small[85, 161, 172]. Sweet, nutty and wholesome[183]. They taste best when roasted[183]. Bulbils from lower part of flowering stem - raw[62].

dwatta Astringent StypticThe root is astringent and styptic[172, 240]. It is used in the treatment of abscesses, as a gargle to treat sore throats and spongy gums, and as a lotion for ulcers[240].

nraakta Arctic and northern regions of Europe, including Britain, Asia and America. On mountains in south. ksacta Mountain grassland and wet rocks[17].

propta Seed - sow spring in a cold frame. Germination is usually free and easy. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer if they have reached sufficient size. If not, overwinter them in a cold frame and plant them out the following spring after the last expected frosts. Division in spring or autumn. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Succeeds in an ordinary garden soil[1] but prefers a moisture retentive not too fertile soil in sun or part shade[200]. Repays generous treatment[1]. Plants seem to be immune to the predations of rabbits[233]. Plants do not often produce viable seed, reproducing by means of bulbils formed on the lower portion of the flowering stem. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

4.2.95 *Amaranthus retroflexus*

Pigweed, Redroot amaranth, Wild Beet

3 tin 11 cyuc 3 kcaak 2 tcan 2 dwat 0.9 m hku
htut cyuti hgattcup hwicli hrasljutnyik hpa7ti frusflatprikliwslipp hpa7tmwatli fyif hjonli

drutta *Amaranthus retroflexus* is an ANNUAL growing to 0.9 m (3ft). See above for USDA hardness. It is hardy to UK zone 4 and is frost tender. It is in flower from July to September, and the seeds ripen from August to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It cannot grow in the shade. It prefers moist soil and can tolerate drought.

pcista No members of this genus are known to be poisonous, but when grown on nitrogen-rich soils they are

known to concentrate nitrates in the leaves. This is especially noticeable on land where chemical fertilizers are used. Nitrates are implicated in stomach cancers, blue babies and some other health problems. It is inadvisable, therefore, to eat this plant if it is grown inorganically.

kcakta Edible Parts: Leaves SeedEdible Uses: Young leaves - raw or cooked as a spinach[2, 5, 62, 85, 159]. A mild flavour, it is often mixed with stronger flavoured leaves[183]. Very rich in iron, it is also a good source of vitamins A and C[201]. Seed - raw or cooked[2, 46, 61, 85]. Ground into a powder and used as a cereal substitute[5], it can also be sprouted and added to salads. The seed is very small, about 1mm in diameter[266], but easy to harvest and very nutritious. The flavour is greatly improved by roasting the seed before grinding it[183]. It is often added to maize meal[183]. The seed can be cooked whole, and becomes very gelatinous like this, but it is rather difficult to crush all of the small seeds in the mouth and thus some of the seed will pass right through the digestive system without being assimilated[K].

tcanta Dye FodderYellow and green dyes can be obtained from the whole plant[168]. Like many other species of *Amaranthus*, this plant may be harmful and even deadly when fed to cattle and pigs in large amounts. However, when supplied in moderation, it is regarded as an exceptionally nutritious fodder.

dwatta AstringentA tea made from the leaves is astringent[222]. It is used in the treatment of profuse menstruation, intestinal bleeding, diarrhoea etc[222, 238, 257]. An infusion has been used to treat hoarseness[257].

nraakta Tropical America. A casual in Britain[17]. ksacta A casual of cultivated land and waste places in Britain[17].

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

nwatta Prefers a well-drained fertile soil in a sunny position[200]. Requires a hot sheltered position if it is to do well[K]. Plants should not be given inorganic fertilizers, see notes above on toxicity. A good companion for potatoes, onions, corn, tomatoes, peppers and aubergines[20, 201]. A deep rooted plant, bringing up minerals from lower levels of the soil[201]. Formerly cultivated as a food crop by the N. American Indians[85]. Most if not all members of this genus photosynthesize by a more efficient method than most plants. Called the 'C4 carbon-fixation pathway', this process is particularly efficient at high temperatures, in bright sunlight and under dry conditions[196]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is clumping, giving the plant a clumping habit. The predictable growth behaviour makes it easier to maintain without having to apply containment methods[2-1].

4.2.96 *Tragopogon pratensis*

Goat's Beard

3 tin 7 cyuc 3 kcaak 0 tcan 2 dwat 0.6 m hku
htut cyuti tcup hwicli hrasljutnyikfrip hpa7ti flatprikliw hpa7tmwatli fyifxre7t hjonli

drutta *Tragopogon pratensis* is an ANNUAL/PERENNIAL growing to 0.6 m (2ft). See above for USDA hardness. It is hardy to UK zone 3 and is not frost tender. It is in flower from June to July, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

kcakta Edible Parts: Leaves Root StemEdible Uses: Root - raw or cooked[2, 9, 12, 52, 100]. The roots have a sweet flavour due to their inulin content[7]. The young roots can be eaten raw whilst older roots are best cooked like parsnips or salsify[9]. They are often blanched before use[183]. Young leaves and shoots - raw or cooked[2, 5, 12, 52, 62, 183]. They can be added to mixed salads or used in

of very old plants is taken internally to improve vision and strengthen the liver.

nrakta Tropical Asia ksacta A widely cultivated plant, it is not known in a truly wild situation.

propta Seed - sow late spring in situ. An earlier sowing can be made in a greenhouse and the plants put out after the last expected frosts. Germination is usually rapid and good if the soil is warm[133]. A minimum soil temperature of 10°c is required for germination, germination is better at temperatures above 20°c[206]. A drop in temperature overnight aids germination[133]. Cuttings of growing plants root easily[206].

nwatta Landscape Uses:Border, Container, Foundation, Specimen. Prefers a light well-drained fertile soil in a sunny position[200, 206], though it does succeed in heavier soils[206]. Tolerates fairly acid soils[206]. Tolerates a pH in the range 4.3 to 7.8. This is basically a tropical plant and so requires a hot sheltered position in temperate climates if it is to do well[206, K]. Plants should not be given inorganic fertilizers, see notes above on toxicity. A polymorphic species[1], it is often cultivated for its edible leaves, there are many named varieties[206]. This species is often cultivated in Asia for its edible leaves and seed[46, 58]. It is a very ornamental plant and is often grown in the flower garden[200]. Most if not all members of this genus photosynthesize by a more efficient method than most plants. Called the 'C4 carbon-fixation pathway', this process is particularly efficient at high temperatures, in bright sunlight and under dry conditions[196]. Special Features:Attractive foliage, Edible, Suitable for cut flowers, Suitable for dried flowers. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is clumping, giving the plant a clumping habit. The predictable growth behaviour makes it easier to maintain without having to apply containment methods[2-1].

4.2.92 Lonicera villosa

Mountain fly honeysuckle, Fuller's honeysuckle

3 tin 9 cyuc 3 kcaok 0 tcan 0 dwat 1.5 m hkuc htut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Lonicera villosa is a deciduous Shrub growing to 1.5 m (5ft) at a slow rate. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

ksakta Edible Parts: FruitEdible Uses: Fruit - raw or preserved[43, 105, 200]. A milder flavour than most edible honeysuckles, they can be eaten raw but are mainly used in making jams, jellies and refreshing drinks[183]. There is a distinct bitterness in the flavour, even when fully ripe[K].

nrakta N. America - Newfoundland to Alaska, south to Pennsylvania, Wisconsin and California. ksacta Peaty or rocky barrens, bogs and bushy places[43], especially on limestone.

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed requires 2 months cold stratification[113] and should be sown as soon as possible in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7-10cm with or without a heel, July/August in a frame. Good percentage[78]. Cuttings of mature wood of the current season's growth, 15-20cm with or without a heel, November in a cold frame. Good percentage[78]. Layering in autumn[200].

nwatta Prefers a good moist soil in a sunny position, fruiting less well when grown in the shade[200]. Closely related to L. caerulea[200]. Polymorphic. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2].

4.2.93 Oxalis acetosella

Wood Sorrel

3 tin 7 cyuc 3 kcaok 3 tcan 2 dwat 0.1 m hkuc pcmhmmhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli fyfxtre7t hjonli

drutta Oxalis acetosella is a PERENNIAL growing to 0.1 m (0ft 4in) by 0.3 m (1ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, cleistogamy. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

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

ksakta Edible Parts: Flowers LeavesEdible Uses: Curdling agentLeaves - raw or cooked[2, 7, 12, 37]. A delicious lemony flavour, the leaves make a refreshing, thirst-quenching munch and are also added to salads, soups, sauces etc[183]. This leaf should be used in moderation[4, 5, 9, 76], see the notes above on toxicity. Flowers - raw. A decorative addition to salads[K]. The dried plant can be used as a curdling agent for plant milks[66].

tcanta CleanserThe juice of the leaves removes iron mould stains from linen[6, 66, 115]. Plants can be grown as a ground cover in woodland or under the shade of shrubs[208]. They should be spaced about 45cm apart each way[208].

dwatta Anodyne Antiscorbutic Astringent Diuretic Emmenagogue Expectorant Febrifuge Irritant StomachicThe fresh or dried leaves are anodyne, antiscorbutic, astringent, diuretic, emmenagogue, expectorant, febrifuge, irritant and stomachic[4, 7, 9, 21]. A decoction is used in the treatment of fevers, both to quench the thirst and allay the fever[4]. Externally, the leaves are crushed and applied locally to dispel boils and abscesses, they also have an astringent affect on wounds[7]. When used internally, some caution is advised due to the oxalic acid content of the leaves[4], the plant is contra-indicated for people suffering from gastritis or a calculus condition[7].

nrakta Europe, including Britain, from Iceland south and east to Spain, N. and C. Asia to Japan. ksacta Moist woods, moorland and on shady rocks[187].

propta Seed - best sown as soon as it is ripe in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in late spring or early summer. Division in spring. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Prefers moist shady conditions and a humus rich soil in shade or dappled sunlight[4, 9, 13, 27, 37, 200]. Dislikes very heavy and wet soils[17]. Plants are hardy to about -25°c[187]. A dainty woodland carpeter growing well in a woodland or wild garden[28, 200]. When well sited the plants can run aggressively and also self-sow[208]. The plant flowers in early spring, but does not produce much fertile seed at this time. Most of the fertile seed is produced from cleistogamous flowers during the summer[17].

4.2.94 Polygonum viviparum

Alpine Bistort

3 tin 7 cyuc 3 kcaok 0 tcan 1 dwat 0.3 m hkuc hmimhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Polygonum viviparum is a PERENNIAL growing to 0.3 m (1ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from June to

Used as a vegetable like parsnips[2, 4, 9, 14, 55, 115]. Stronger in taste than parsnips, but liked by many[207]. A delicious vegetable[244]. Leaves - raw or as a flavouring in soups etc[2, 14, 27, 55, 115]. The young leaves are much less spicy than the seeds and are a good salad[9], having a mild parsley-dill flavour[238]. They give an aromatic tang to salads[244]. Older leaves can be cooked as a spinach[183]. The crushed seeds are brewed into a tea[183]. It has a soothing effect on the digestion[244].

tcanta Essential ParasiticideAn essential oil from the seed is used in perfumery, for scenting soap, as a parasiticide etc[7, 46, 74, 171]. Twenty-five kilos of seed yield about 1 kilo of essential oil[4]. The essential oil yield of the seed from plants cultivated in Poland is up to 10.33%[240]. Caraway is also used as a breath freshener.

dwatta Antiseptic Antispasmodic Aromatic Carminative Digestive Emmenagogue Expectorant Galactagogue Ophthalmic Parasiticide StimulantCaraway has a long history of use as a household remedy especially in the treatment of digestive complaints where its antispasmodic action soothes the digestive tract and its carminative action relieves bloating caused by wind and improves the appetite[4, 238, 254]. It is often added to laxative medicines to prevent griping[238]. The seed is antiseptic, antispasmodic, aromatic, carminative, digestive, emmenagogue, expectorant, galactagogue and stimulant[4, 7, 9, 21, 46, 165, 222, 240]. It can be chewed raw for the almost immediate relief of indigestion and can also be made into infusions[238]. The seed is also used in the treatment of bronchitis and are an ingredient of cough remedies, especially useful for children[254]. The seed is also said to increase the production of breast milk in nursing mothers[254]. The seed is harvested when fully ripe, then dried and stored in a cool, dry place out of the sunlight[244]. The essential oil can be extracted from the seed and has similar properties[4]. A tea made from the seeds is a pleasant stomachic and carminative, it has been used to treat flatulent colic[207, 222]. The seed is used in Tibetan medicine where it is considered to have an acrid taste and a heating potency[241]. It is used to treat falling vision and loss of appetite[241]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Carum carvi for dyspeptic complaints (see [302] for critics of commission E).

nrakta Europe. Rarely naturalized in Britain. Perhaps native in S.E. England[17]. ksacta Moist meadows, arable land and waste places from lowland to mountain elevations[9, 165, 244].

propta Seed - it is best sown in situ as soon as it is ripe in late summer and early autumn[4, 200]. The seed can also be sown March/April in situ[200], though in areas with cool summers the plants might not produce a crop of ripe seeds[238]. Plants are very sensitive to root disturbance and should not be transplanted.

nwatta Succeeds in ordinary garden soil as long as it is not too wet in winter[1]. Prefers a moist soil in full sun or partial shade[4, 200]. Tolerates a pH in the range 4.8 to 7.6. Caraway is a well-known herb that has been cultivated for its culinary and medicinal uses since ancient times[244]. It is frequently cultivated in the modern herb garden and sometimes also commercially[4, 46], there are some named varieties[183]. Plants growing in more northerly latitudes and also in full sun are richer in essential oils and therefore more aromatic[4, 245]. Plants strongly resent root disturbance[200]. They often self-sow freely when in a suitable location[244]. This species is deep rooted[201] and is a good plant for breaking up the sub-soil on heavy wet land[18, 20]. It dislikes growing near fennel or wormwood[14, 20] but is a good companion for most plants, especially those that are shallow-rooted[201]. The flowers attract parasitic wasps to the garden, these prey on aphids and so help to reduce populations of insect pests[238].

4.2.46 Mentha spicata

Spearmint

3 tin 9 cyuc 4 kcaok 3 tcan 3 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hrasljutnyikrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Mentha spicata is a PERENNIAL growing to 0.6 m (2ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from

August to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

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

tcanta Essential Repellent StrewingAn essential oil is obtained from the whole plant, the yield is about 4K of oil from 1 tonne of leaves[46, 57]. The oil is used commercially as a food flavouring and oral hygiene preparation[238]. The plant repels insects and was formerly used as a strewing herb[14, 18, 20]. Rats and mice intensely dislike the smell of mint. The plant was therefore used in homes as a strewing herb and has also been spread in granaries to keep the rodents off the grain[244].

dwatta Antiemetic Antiseptic Antispasmodic Cancer Carminative Diuretic Poulitice Restorative Stimulant StomachicSpearmint is a commonly used domestic herbal remedy. A tea made from the leaves has traditionally been used in the treatment of fevers, headaches, digestive disorders and various minor ailments[222]. The herb is antiemetic, antispasmodic, carminative, diuretic, restorative, stimulant and stomachic[4, 21, 46, 218]. The leaves should be harvested when the plant is just coming into flower, and can be dried for later use[4]. The stems are macerated and used as a poultice on bruises[218]. The essential oil in the leaves is antiseptic, though it is toxic in large doses[222]. Both the essential oil and the stems are used in folk remedies for cancer[218]. A poultice prepared from the leaves is said to remedy tumours[218].

nrakta C. Europe. Naturalized in Britain. ksacta Road-sides and waste places, usually in damp soils and sunny positions[4, 16, 17, 37].

propta Seed - sow spring in a cold frame. Germination is usually fairly quick. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. Mentha species are very prone to hybridisation and so the seed cannot be relied on to breed true. Even without hybridisation, seedlings will not be uniform and so the content of medicinal oils etc will vary. When growing plants with a particular aroma it is best to propagate them by division[K]. Division can be easily carried out at almost any time of the year, though it is probably best done in the spring or autumn to allow the plant to establish more quickly. Virtually any part of the root is capable of growing into a new plant. Larger divisions can be planted out direct into their permanent positions. However, for maximum increase it is possible to divide the roots up into sections no more than 3cm long and pot these up in light shade in a cold frame. They will quickly become established and can be planted out in the summer.

nwatta A very easily grown plant, it succeeds in most soils and situations so long as the soil is not too dry[200]. Grows well in heavy clay soils. A sunny position is best for production of essential oils, but it also succeeds in partial shade[4]. Prefers partial shade and a slightly acid soil[4, 16]. Often grown as a culinary herb in the herb garden, spearmint is also commercially cultivated for its essential oil, the yields are about 3.5 to 4.5 kilos per tonne of leaves. There are some named varieties[200, 238]. Most mints have fairly aggressive spreading roots and, unless you have the space to let them roam, they need to be restrained by some means such as planting them in containers that are buried in the soil[K]. Hybridizes freely with other members of this genus. The whole plant has a strong spearmint smell. The flowers are very attractive to bees and butterflies[24]. A good compan-

ion plant for growing near cabbages and tomatoes, helping to keep them free of insect pests[14, 20]. Members of this genus are rarely if ever troubled by browsing deer[233]. The plant is heat tolerant in zones 7 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2]. Can be grown in containers.

4.2.47 Claytonia sibirica

Pink Purslane, Siberian springbeauty
3 tin 7 cyuc 4 kcaak 3 tcan 1 dwat 0.2 m hkuc
pcimhmimhtut cyutli kyuctcup hwicli hyishrasljutnyik hpa7tli frusflatprikliwis hpa7tmwatli fyifxre7t hjonli
drutta Claytonia sibirica is an evergreen Annual/Perennial growing to 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in leaf all year, in flower from April to July, and the seeds ripen from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked[2, 62, 183]. They usually have a fairly bland flavour and are quite nice in a salad or cooked as a green vegetable. The leaves have a distinct earthy after-taste rather like raw beetroot[K]. They are available all year round but can turn rather bitter in the summer, especially if the plant is growing in a hot dry position[K]. Although on the small side, the leaves are produced in abundance and are very easily harvested[K].

tcanta A good ground cover plant for a shady position[208]. This species is a short-lived perennial but it usually self-sows freely and gives a dense weed-excluding ground cover[K].

dwakta Antidandruff Diuretic Ophthalmic PoulticeThe plant is diuretic[257]. A poultice of the chewed leaves has been applied to cuts and sores[257]. The juice of the plant has been used as eye drops for sore red eyes[257]. A cold infusion of the stems has been used as an antidandruff wash for the hair[257].

nrakta E. Asia - Siberia. Western N. America - Alaska to California. Naturalized in Britain. ksacta Damp woods, shaded streambeds etc, especially on sandy acid soils[17, 50]. Thickets of red alder, dogwood, vine-leaf maple, moist shaded coniferous forests from sea level to 2000 metres[270].

propta Seed - sow spring or autumn in situ. The seed usually germinates rapidly.

nwatta A very tolerant and easily grown plant, it prefers a moist peaty soil[1] and is unhappy in dry situations[K]. It succeeds in full sun[200] though is happier when given some shade and also grows in the dense shade of beech trees[88]. Plants usually self-sow freely[200, K]. This is an excellent and trouble-free salad plant. It is extremely cold-hardy and can provide edible leaves all year round in all areas of the country even if it is not given protection[K]. montia sibirica (L.) Howell is a synonym of Claytonia sibirica L. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available.

A clumping mat former. Forming a dense prostrate carpet spreading indefinitely [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2].

4.2.48 Acer saccharinum

Silver Maple, River Maple, Soft Maple
3 tin 9 cyuc 3 kcaak 4 tcan 1 dwat 30 m hkuc
hmimhtut cyutli tcup hwicli hrasljutnyikfrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Acer saccharinum is a deciduous Tree growing to 30 m (98ft) by 15 m (49ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from February to March, and the seeds ripen from April to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: Inner bark Leaves Sap SeedEdible Uses: SweetenerThe sap contains sugar and can be used as a drink or be concentrated into a syrup by boiling off the water[4, 61, 82, 159]. The syrup is used as a sweetener on many foods. The yield is only half that of A. saccharum[2]. It is said to be sweeter and whiter than A. saccharum[183]. The sap can be harvested in the late winter, the flow is best on warm sunny days following a frost. The best sap production comes from cold-winter areas with continental climates. Self-sown seedlings, gathered in early spring, are eaten fresh or dried for later use[177, 213]. Seeds - cooked. The wings are removed and the seeds boiled then eaten hot[213]. Good crops are produced nearly every year in the wild[229]. The seed is about 12mm long and is produced in small clusters[82]. Inner bark - cooked. It is dried, ground into a powder and then used as a thickening in soups etc or mixed with cereals when making bread[105, 161, 177, 257]. The related Oregon Maple (Acer macrophyllum) has yellow flower clusters, sweet with nectar, eaten raw[183]. No information was found for this species. Carbon farming - Staple Crop: sugar.

tcanta Companion Dye Fodder Preservative Rust Shelterbelt WoodThe leaves are packed around apples, rootcrops etc to help preserve them[18, 20]. A fairly wind-tolerant tree, it can be used in shelterbelt plantings[200]. The branches are rather brittle, however, and can break off even in minor storms[226]. The stems are used in making baskets[257]. The boiled inner bark yields a brown dye[106]. Mixed with lead sulphate this produces a blue/black dye which can also be used as an ink[106]. A black dye is obtained from the twigs and bark[257]. The bark can be boiled, along with hemlock (Tsuga spp) and swamp oak bark (Quercus bicolor) to make a wash to remove rust from iron and steel, and to prevent further rusting[257]. Wood - rather brittle, close-grained, hard, strong, easily worked but not durable. It weighs 32lb per cubic metre. It has many uses such as veneer, cooperage, furniture, flooring and pulp[11, 46, 82, 227, 235]. Carbon Farming - Industrial Crop; biomass. Agroforestry Services: crop shade. Fodder: bank. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Antispasmodic Astringent Dysentery Ophthalmic Skin VDA n infusion of the bark is used in the treatment of coughs, cramps and dysentery[257]. The infusion is also applied externally to old, stubborn running sores[257]. A compound infusion is used in the treatment of 'female complaints'[257]. The inner bark is boiled and used with water as a wash for sore eyes[257]. An infusion is used internally in the treatment of diarrhoea[257]. An infusion of the root bark has been used in the treatment of gonorrhoea[257].

nrakta Eastern N. America - New Brunswick to Florida, west to Oklahoma, Kansas and Nebraska. ksacta Banks of rivers, usually in sandy soils[43, 82]. Trees are occasionally found in deep often submerged swamps[82].

propta Seed - best sown as soon as it is ripe in the spring in a cold frame. It usually germinates immediately and by the end of summer has formed a small tree with several pairs of leaves[82]. Stored seed quickly loses its viability. Pre-soak stored seed for 24 hours and then stratify for 2 - 4 months

4.2.90 Filipendula ulmaria

Meadowsweet, Queen of the meadow, Double Lady of the Meadow, European Meadowsweet
3 tin 9 cyuc 3 kcaak 3 tcan 3 dwat 1.2 m hkuc
hmimhtut cyutli toupjha7n hwicli hrasljutnyikfrip hpa7tli prikliwis hpa7tmwatli fyifxre7t hjonli

drutta Filipendula ulmaria is a PERENNIAL growing to 1.2 m (4ft) by 0.4 m (1ft 4in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 2 and is not frost tender. It is in flower from June to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

pcista Avoid for asthmatics. Use by children for diarrhoea not recommended or for children under 12 due to salicylate content (risk of Reye's syndrome) [301].

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Condiment TeaAll parts of the plant are edible. Root - cooked[2, 141]. Young leaves - cooked as a flavouring in soups[177]. Young leaves, flowers and roots are brewed into a tea[183]. The dried leaves are used as a flavouring[12, 100], especially as a sweetener in herb teas[13, 183]. The flowers are used as a flavouring in various alcoholic beverages and in stewed fruits[183]. Adding them to wine or beer is said to make a very heady brew[244]. They are also made into a syrup which can be used in cooling drinks and fruit salads[183].

tcanta Dye Essential Pot-pourri StrewingA black dye is obtained from the roots. It is brown[141]. A yellow dye is obtained from the plant tops[106]. An essential oil obtained from the flower buds is used in perfumery[46, 61]. The whole plant, but especially the leaves[245], was formerly used as a strewing herb, imparting an almond-like fragrance[4, 66]. Strongly aromatic, its delightful perfume would completely fill the room[244]. Both flowers and leaves have been used in pot-pourri, retaining their scent for several months. The scent of the dried flowers becoming more and more pleasant with age[245].

dwatta Alterative Antinflammatory Antirheumatic Antiseptic Aromatic Astringent Diaphoretic Diuretic Dysentery Homeopathy Stomachic TonicMeadowsweet has a very long history of herbal use, it was one of the three most sacred herbs of the Druids[238]. The leaves and flowering stems are alternative, anti-inflammatory, antiseptic, aromatic, astringent, diaphoretic, diuretic, stomachic and tonic[4, 9, 21, 165]. The plant is harvested in July when it is in flower and can be dried for later use[4]. The flower head contains salicylic acid, from which the drug aspirin can be synthesised[200, 238]. Unlike the extracted aspirin, which can cause gastric ulceration at high doses, the combination of constituents in meadowsweet act to protect the inner lining of the stomach and intestines whilst still providing the anti-inflammatory benefits of aspirin[257]. The herb is a valuable medicine in the treatment of diarrhoea, indeed it is considered almost specific in the treatment of children's diarrhoea[4]. It is also considered to be a useful stomachic, being used to treat hyperacidity, heartburn, gastritis and peptic ulcers, for which it is one of the most effective plant remedies[4, 238]. It is also frequently used in the treatment of afflictions of the blood[4]. Meadowsweet is also effective against the organisms causing diphtheria, dysentery and pneumonia[238]. This remedy should not be given to people who are hypersensitive to aspirin[238]. A strong decoction of the boiled root is said to be effective, when used externally, in the treatment of sores and ulcers[244]. A homeopathic remedy is made from the fresh root[9]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Filipendula ulmaria Meadowsweet for cough, bronchitis, fever and cold (see [302] for critics of commission E).

nrakta Europe, including Britain, from Iceland south and east to Spain, temperate Asia and Mongolia. ksacta Wet ground in swamps, marshes, fens, wet woods and meadows, wet rock ledges and by rivers, but not on acid peats[17].

propta Seed - best sown in the autumn in a cold frame[1]. The seed can also be sown in a cold frame in spring, germinating best at a temperature of 10 - 13°C[200]. When they

are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer if they have grown enough. If not, keep them in a cold frame for the winter and plant them out in late spring. Division in autumn or winter[200]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Landscape Uses:Border, Massing, Rock garden, Seashore, Specimen, Woodland garden. Requires a humus-rich moist soil in semi-shade[200]. Succeeds in full sun only if the soil is reliably moist throughout the growing season[200]. Dislikes dry or acid soils[1, 17]. Does well in marshy soils[24, 200]. Grows well in heavy clay soils. The flowers have a strong sweet smell[4], which for many people is sickly[245]. The leaves are also aromatic[187], though the scent is very different from the flowers[4]. The leaves are pleasantly aromatic[245]. A good bee plant[24, 30]. Members of this genus are rarely if ever troubled by browsing deer[233]. Special Features:Attractive foliage, Edible, Fragrant foliage, Not North American native, Naturalizing, Suitable for cut flowers, Suitable for dried flowers, Fragrant flowers.

4.2.91 Amaranthus tricolor

Chinese Spinach, Joseph's-coat, Fountain Plant, Tampala , Summer Poinsettia

3 tin 11 cyuc 3 kcaak 2 tcan 1 dwat 1 m hkuc
htut cyutli hgattcup hwicli hyishrasljutnyik hpa7tli frusflatprikliwis hpa7tmwatli fyif hjonli

drutta Amaranthus tricolor is a ANNUAL growing to 1 m (3ft 3in) by 0.5 m (1ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in leaf from April to October, in flower from June to August, and the seeds ripen from July to September. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It cannot grow in the shade. It prefers moist soil and can tolerate drought.

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

kcakta Edible Parts: Leaves Seed StemEdible Uses: Leaves - raw or cooked. Often used as the young seedling stage[2, 46, 61], they are also cooked as a spinach and have a very mild flavour[183]. An excellent hot weather substitute for spinach[183]. The leaves contain about 3.5% protein, 0.25% fat, 6.6% carbohydrate, 3.1% ash, 24mg iron per 100g, 464mg calcium per 100g, they are rich in vitamin A and have a fair content of vitamins B1 and C[179]. On a zero moisture basis 100g of the leaves contains up to 2441mg calcium, 1008mg phosphorus, 51mg iron, 34mg sodium, 4475mg potassium, 37,623 micrograms beta-carotene equivalent, 0.68mg thiamine, 2.37mg riboflavin, 11.48mg niacin and 730mg ascorbic acid[218]. The crisp interior of large stems makes a tasty vegetable[183]. It can be eaten raw or cooked as an asparagus substitute[2, 61]. Seed - cooked[22, 177]. Very small, about 1mm in diameter[266], but easy to harvest and very nutritious. The seed can be cooked whole, and becomes very gelatinous like this, but it is rather difficult to crush all of the small seeds in the mouth and thus some of the seed will pass right through the digestive system without being assimilated[K]. The seed contains saponins[218]. If this is the case it is probably best to either soak the seed for at least 12 hours and then rinse thoroughly before cooking or to give the seed a long slow cooking in order to destroy the saponins[K].

tcanta DyeYellow and green dyes can be obtained from the whole plant[168].

dwatta AstringentThe whole plant is astringent[240]. A decoction of the root is used with Cucurbita moschata to control haemorrhage following abortion[218]. A decoction

UK zone 3. It is in flower from May to June, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105]. Large, sweet and tasty[2, 74]. The red fruit is up to 15mm in diameter[266].

nrakta E. Asia - northern China, Siberia. ksacta Open stony mountain and hill slopes[74]. Forest margins, thickets and rocky slopes at elevations of 1500 - 2100 metres in northern China[266].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. Stored seed requires 3 months cold stratification at 0 - 9°C and should be sown as early in the year as possible[113, 164]. Under normal storage conditions the seed can remain viable for 17 years or more. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter, planting them out in late spring of the following year. Cuttings of half-ripe wood, July/August in a frame[113]. Cuttings of mature wood of the current year's growth, preferably with a heel of the previous year's growth, November to February in a cold frame or sheltered bed outdoors[78, 200].

nwatta Easily grown in a moisture retentive but well-drained loamy soil of at least moderate quality[11, 200]. Quite tolerant of shade though not fruiting so well in such a position[11]. The dormant plant is hardy to about -20°C[200]. This species is closely related to *R. breujense*[200]. Plants can harbour a stage of 'white pine blister rust', so they should not be grown in the vicinity of pine trees[155]. Plants in this genus are notably susceptible to honey fungus[200].

4.2.88 Prunus cerasus frutescens

Bush Sour Cherry

3 tlin 7 cyuc 3 kcak 3 tcan 1 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatprikwis hpa7tmwatli fyifxre7t hjonli

drutta *Prunus cerasus frutescens* is a deciduous Tree growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in May, and the seeds ripen in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: Fruit Oil Oil SeedEdible Uses: Gum Gum Oil Oil TeaFruit - raw or cooked[1, 2, 5, 11, 12]. Neither bitter nor sweet, the fruit is pleasantly acid and can be eaten out of hand, used in pies, preserves etc or dried for later use[183]. The fruit is about 10mm in diameter and contains one large seed[200]. Seed - raw or cooked. Do not eat the seed if it is too bitter - see the notes above on toxicity. An edible oil is obtained from the seed[46, 61]. When refined it is used as a salad oil[183]. The leaves are used as a tea substitute[46, 61, 183]. A gum obtained from the trunk is used for chewing[61, 64].

tcanta Adhesive Dye Gum Gum Hedge Hedge Oil Oil WoodAn edible drying oil obtained from the seed is also used in cosmetics[61]. The gum obtained from the stem is also used as an adhesive[61, 64]. Plants can be grown as a hedge[50], succeeding in fairly exposed positions[K]. A green

dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168].

dwatta Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta S.E. Europe to W. Asia. ksacta Not known in the wild[11].

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[113]. Soft-wood cuttings from strongly growing plants in spring to early summer in a frame. Layering in spring. Division of suckers during the dormant season. They can be planted out direct into their permanent positions.

nwatta Thrives in a well-drained moisture-retentive loamy soil[11, 200]. Prefers some lime in the soil but is likely to become chlorotic if too much lime is present[1]. Prefers an acid soil according to another report[5]. Succeeds in sun or partial shade though it fruits better in a sunny position[11, 200]. Hardy to about -20°C[184]. A shrub with a suckering habit, this subspecies has long been cultivated for its edible fruit, especially in Russia[11]. There are several named varieties[200] including 'Ostheim' which has been cultivated in Britain[11]. This subspecies has smaller fruits[200]. Most members of this genus are shallow-rooted[238]. Plants in this genus are notably susceptible to honey fungus[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A sprouting standard sending up shoots from the base [1-2].

4.2.89 Ligusticum canbyi

Osha

3 tlin 6 cyuc 3 kcak 2 tcan 0 dwat 1.2 m hkuc pcmhmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikwis hpa7tmwatli hjonli

drutta *Ligusticum canbyi* is a PERENNIAL growing to 1.2 m (4ft) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: Leaves Root Shoots StemEdible Uses: Leaves shoots and stems. A pleasant taste. The young leaves, shoots and stems can all be eaten. They have a strong celery flavour [1-2]. The root is chewed rather than eaten. Can be used as a culinary herb [1-2].

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

nrakta Western North America. ksacta Moist stream-banks, slopes and meadows in the montane grasslands and shrublands zone.

propta Seed, Division.

nwatta A stout perennial herb from a thick taproot. The taproot is thick and fibrous. Prefers full shade and semi shade. Moist or wet soil. It grows in moist and wet stream banks. It grows at moderate and high elevations in Canada. Elevation (metres) 560 to 2300. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

at 1 - 8°C. It can be slow to germinate. When large enough to handle, prick the seedlings out into individual pots and grow them on until they are 20cm or more tall before planting them out in their permanent positions. Layering, which takes about 12 months, is successful with most species in this genus. Cuttings of young shoots in June or July. The cuttings should have 2 - 3 pairs of leaves, plus one pair of buds at the base. Remove a very thin slice of bark at the base of the cutting, rooting is improved if a rooting hormone is used. The rooted cuttings must show new growth during the summer before being potted up otherwise they are unlikely to survive the winter.

nwatta Agroforestry Services: Crop shade Fodder: Bank Industrial Crop: Biomass Management: Copice Management: Standard Staple Crop: SugarLandscape Uses:Erosion control, Firewood, Aggressive surface roots possible, Woodland garden. Of easy cultivation, it prefers a good moist well-drained soil[1, 11] but does well in much wetter soils than most member of the genus. Succeeds in most soils including chalk[98]. Another report says that this species is liable to become chlorotic as a result of iron deficiency when it is grown on alkaline soils. Grows well in heavy clay soils. Prefers a moderately sunny position[11, 200]. Tolerates atmospheric pollution[200]. Fairly wind-tolerant[200]. The wood is brittle and branches are liable to break off the tree in high winds[11, 200]. Trees can tolerate short periods of flooding, but are very susceptible to fire[229]. A very ornamental[1] and fast growing tree[11, 98], but it is short-lived[227], seldom surviving longer than 125 - 140 years[229]. The tree has invasive roots and these often interfere with sewer pipes and drainage tiles around houses[226]. The silver maple is a bad companion plant, inhibiting the growth of nearby plants[18, 20]. Special Features:Attracts birds, North American native, Naturalizing. Carbon farming - Cultivation: experimental. Management: standard, coppice. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2].

4.2.49 Quercus x hybrid

Burgambel oak

3 tlin 8 cyuc 3 kcak 3 tcan 2 dwat 30 m hkuc hmimhtut cyutli hgatkyuctup hwicli jlutnyik hpa7tli flatprikwis hpa7tmwatli hjonli

drutta *Quercus x hybrid* is a deciduous Tree growing to 30 m (98ft) by 15 m (49ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. The flowers are pollinated by Wind. It is noted for attracting wildlife. Suitable for: medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: Carbon Farming Solutions - Staple Crop: balanced carb (The term staple crop typically refers to a food that is eaten routinely and accounts for a dominant part of people's diets in a particular region of the world) [1-1].

tcanta FodderCarbon Farming Solutions - Industrial Crop: tannin (Crops grown for non-food uses. Industrial crops provide resources in three main categories: materials, chemicals, and energy. Traditional materials include lumber and thatch, paper and cardboard, and textiles) [1-1]. Fodder: mast. Drought-tolerant; suitable for xeriscaping

dwatta DysenteryNone Report. As a cross between *Quercus macrocarpa* and *Quercus gambelii* we may expect some of the medicinal qualities to be present. *Quercus macrocarpa* has Antispasmodic; Astringent; and Tonic qualities. The bark is astringent and tonic[61]. An infusion has been used in the treatment of diarrhoea[257]. A decoction of the root or inner bark has been used in the treatment of cramps[257]. Any galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4]. *Quercus gambelii* has Analgesic; Astringent; and Cathartic properties. Any galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4]. The acorns have been eaten to give greater sexual potency[257]. The root bark is analgesic and cathartic[257]. A decoction has been used to treat postpartum pain and facilitate delivery of the placenta[257].

nrakta Origin: Natural hybrid in W. N. America. ksacta A cross between the bur oak, whose native range is in the eastern U.S., and the Gambel oak, whose native range is in the southwestern U.S. and Mexico.

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Experimental Crop Fodder: Mast Industrial Crop: Tannin Management: Standard Staple Crop: Balanced carbClimate: boreal to warm temperate. Humidity: semi-arid to humid. A naturally occurring cross between the bur oak, whose native range is in the eastern U.S., and the Gambel oak, whose native range is in the southwestern U.S. and Mexico. It is a member of the white oak group and produces abundant acorns annually. The mature size of the tree can vary from large tree (typical of bur oaks) to medium tree/large shrub (typical of Gambel oaks) depending on its environment. Both parents are known to be tough and drought-tolerant. Burgambel acorns are low in tannins and relatively quick to bear, between three and six years [1-1]. The low tannins make them more palatable. Burgambel begins producing acorns at a young age when the trees are only 3-6 feet tall. The acorns ripen early in the season. Burgambel averages 1-2 ft. in height per year. Carbon Farming Solutions - Cultivation: experimental as food. Management: standard (Describes the non-destructive management systems that are used in cultivation) [1-1]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2].

4.2.50 Tilia americana

American Basswood, Carolina basswood, Basswood, AmericanBasswood, American Linden

3 tlin 9 cyuc 3 kcak 3 tcan 3 dwat 25 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikwis hpa7tmwatli xre7t hjonli

drutta *Tilia americana* is a deciduous Tree growing to 25 m (82ft) by 12 m (39ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower in July, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

pcista Frequent consumption of the tea made from the flowers may cause heart damage[222].

kcakta Edible Parts: Flowers Leaves SapEdible Uses: Chocolate Sweetener TeaYoung leaves - raw or cooked[257]. A mild flavour and a tender but mucilaginous texture, they are very nice in salads[K]. The leaves can be cooked as

greens[257]. Sap - obtained from next to the bark and used as a refreshing drink[105, 161, 177]. It can also be concentrated into a syrup and used as a sweetener[183]. Flowers - raw. They can be added to salads[183]. The flowers are used as a tea substitute. They are sweet and fragrant[183]. A very good chocolate substitute is made from a paste of the ground fruits and flowers[2, 105, 177, 183]. Trials on marketing the product failed because the paste decomposes readily[2].

tcanta Fibre Shelterbelt WoodA tough fibre is obtained from the inner bark[46, 227]. The bark is soaked in water then boiled. It is then rubbed on a stick to separate the fibres which can then be used for making thread for sewing, fine yarn for weaving bags, clothing etc and cordage for making nets, shoes, twine, mats etc[189, 226, 227, 257]. A fairly wind resistant tree, it can be grown as part of a shelterbelt planting[200]. Wood - soft, straight grained, light, weak, not durable, easily worked, resistant to splitting, it holds nails badly, holds glue, paint and lacquer well, seasons well but shrinks considerably. It weighs 28lb per cubic foot[227], is odorless and bland-tasting[226]. A commercially important timber in its native range[226, 229]. The white wood is excellent for turning and carving, it is used for making woodenware such as spoons, cheap furniture, pulp etc[46, 82, 171, 227, 229]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Antispasmodic Demulcent Diaphoretic Diuretic Dysentery Ophthalmic Poultice Sedative VermifugeA tea made from the inner bark is applied to burns - it soothes and softens the skin[213]. It is taken internally in the treatment of lung complaints, dysentery, heart burn and weak stomach[222, 257]. The bark is diuretic[257]. An infusion has been taken to promote urination[257]. A decoction of the bark, mixed with corneal, has been used as a poultice to draw out boils[222, 257]. A tea made from the fresh or dried flowers is antispasmodic, diaphoretic and sedative[226]. It is used in the treatment of hypertension, hardening of the arteries, digestive complaints associated with anxiety, feverish colds, respiratory catarrh, migraine etc[238]. Lime flowers are said to develop narcotic properties as they age and so they should only be harvested when freshly opened[238]. An infusion of the leaves has been used as an eyewash[257]. A poultice of the leaves has been used in the treatment of burns and scalds, broken bones and swollen areas[257]. A tea or tincture made from the leaves, flowers and buds has traditionally been used for nervous headaches, restlessness and painful digestion[222]. Use with caution, see notes above on toxicity. A decoction of the roots and the bark has been taken in the treatment of internal haemorrhaging[257]. A decoction of the roots has been used as a vermifuge to rid the body of worms[257].

nrakta Central and Eastern N. America - New Brunswick to Florida, west to Texas and Manitoba. ksacta Rich, often moist, soils of woods and bottomlands, often forming pure stands[82, 227].

propta Seed - much of the seed produced in Britain is not viable, cut a few seedcases open to see if there is a seed inside[80]. If possible, obtain fresh seed that is ripe but has not as yet developed a hard seed coat and sow it immediately in a cold frame. It may germinate in the following spring though it could take 18 months[80]. Stored seed can be very slow to germinate. It has a hard seed coat, embryo dormancy and a hard coat on the pericarp. All these factors mean that the seed may take up to 8 years to germinate[80]. One way of shortening this time is to stratify the seed for 5 months at high temperatures (10°C at night, up to 30°C by day) and then 5 months cold stratification[80]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Layering in spring just before the leaves unfurl. Takes 1 - 3 years[78]. Suckers, when formed, can be removed with as much root as possible during the dormant season and replanted immediately[200].

nwatta Landscape Uses:Pollard, Screen, Specimen, Street tree. Prefers a good moist loamy alkaline to neutral soil but succeeds on slightly acid soils[11, 200]. Grows poorly on any very dry or very wet soils[200]. Dislikes exposed positions[200]. Another entry in the same book says that it is fairly wind tolerant[200]. Succeeds in full sun or semi-shade[188]. A fast-growing and moderately long-lived tree

in the wild, it starts producing seed when about 15 years old and continues for at least another 85 years[229]. It is generally unsatisfactory in Britain, preferring a continental climate and growing more slowly and not usually producing fertile seed in areas with cool summers[200]. Grows best in a woodland situation, young plants tolerate a reasonable level of side shade[200]. They are highly shade-tolerant according to another report[226]. Trees respond well to coppicing, sending up lots of suckers from the roots[226]. Lime trees tend to hybridise freely if other members of the genus are growing nearby[238]. If growing plants from seed it is important to ensure the seed came from a wild source or from an isolated clump of the single species[K]. A good bee plant[61, 159]. Trees are usually attacked by aphids which cover the ground and the leaves with a sticky honeydew[188]. Quite tolerant of root disturbance, semi-mature trees up to 5 metres tall have been transplanted successfully. Plants in this genus are notably resistant to honey fungus[200]. Special Features:North American native, Fragrant flowers, Attractive flowers or blooms. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A sprouting standard sending up shoots from the base [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

4.2.51 Juglans cinerea

Butternut - White Walnut, Butternut

3 tin 7 cyuc 3 kcaak 3 tcan 3 dwat 25 m hkuc
htut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikkwis
hpa7tmwatli fyif hjonli

drutta Juglans cinerea is a deciduous Tree growing to 25 m (82ft) by 20 m (65ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from May to June, and the seeds ripen from October to November. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista The naphthoquinone constituents may cause gastric (stomach) irritation. Avoid in patients with gallstones [301].

kcaakta Edible Parts: Oil Sap SeedEdible Uses: Oil SweetenerSeed - eaten raw or ground into a powder and used with cereal flours in making cakes, biscuits, muffins, bread etc[183]. Oily and sweet tasting with a rich agreeable flavour[11, 62, 63, 101, 183]. The oil in the seed is not very stable and the seed soon becomes rancid once it is opened[82]. The kernel is usually only about 20% by weight of the whole seed[160] and is hard to extract[226]. The unripe fruit can be pickled[183]. The seed is 3 - 6cm in diameter and is produced in clusters of 3 - 5 fruits[82, 229]. An edible oil is obtained from the seed[101, 117, 183], it tends to go rancid quickly. The sweet sap is tapped in spring and can be used as a refreshing drink[101]. It can also be boiled down to a syrup or sugar, or added to maple syrup[82, 101, 117, 159, 183].

tcanta Dye Herbicide Oil WoodA yellow to orange dye is obtained from the seed husks[46, 61, 82] and from the bark[57]. It is dark brown[95, 101]. It does not require a mordant[169]. The seed husks can be dried and stored for later use[169]. A light brown dye is obtained from the young twigs, leaves, buds and unripe fruit[117, 169, 213]. It does not require a mordant[169]. The leaves can also be dried and stored for later use[169]. A black dye is obtained from

spring is especially vulnerable, but older growth is also attacked and even well-established plants have been destroyed in wet years[K]. Plants resent root disturbance and are best planted into their final positions whilst small[134]. Special Features:Attractive foliage, North American native, Naturalizing, Wetlands plant, Attracts butterflies, Suitable for cut flowers, Fragrant flowers. The plant is heat tolerant in zones 9 through 2. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

4.2.86 Symphytum officinale

Comfrey, Common comfrey

3 tin 10 cyuc 3 kcaak 4 tcan 5 dwat 1.2 m hkuc
hmimhtut cyutli tcup hwicli hrasljutnyikfrip hpa7tli flatprikkwis
hpa7tmwatli xre7t hjonli

drutta Symphytum officinale is a PERENNIAL growing to 1.2 m (4ft) by 0.6 m (2ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to June, and the seeds ripen from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista This plant contains small quantities of a toxic alkaloid which can have a cumulative effect upon the liver. Largest concentrations are found in the roots, leaves contain higher quantities of the alkaloid as they grow older and young leaves contain almost none. Most people would have to consume very large quantities of the plant in order to do any harm, though anyone with liver problems should obviously be more cautious. In general, the health-promoting properties of the plant probably far outweigh any possible dibenefits, especially if only the younger leaves are used. Use topically on unbroken skin. May cause loss of appetite, abdominal pain, vomiting. Do not use with Eucalyptus. Do not combine with herbs containing pyrrolizidine alkaloids (e.g. agrimony, alpine ragwort, help, tansy ragwort) [301].

kcaakta Edible Parts: LeavesEdible Uses: Gum TeaYoung leaves - cooked or raw[2, 4, 5, 9, 46, 61]. The leaf is hairy and the texture is mucilaginous. It may be full of minerals but it is not pleasant eating for most tastes. It can be chopped up finely and added to salads, in this way the hairiness is not so obvious[183, K]. Young shoots can be used as an asparagus substitute[46]. The blanched stalks are used[183]. Older leaves can be dried and used as a tea[26]. The peeled roots are cut up and added to soups[183]. A tea is made from the dried leaves and roots[183]. The roasted roots are used with dandelion and chicory roots for making coffee[183].

tcanta Biomass Compost GumThe plant grows very quickly, producing a lot of bulk. It is tolerant of being cut several times a year and can be used to provide 'instant compost' for crops such as potatoes. Simply layer the wilted leaves at the bottom of the potato trench or apply them as a mulch in no-dig gardens. A liquid feed can be obtained by soaking the leaves in a small amount of water for a week, excellent for potassium demanding crops such as tomatoes. The leaves are also a very valuable addition to the compost heap[26, 200]. A gum obtained from the roots was at one time used in the treatment of wool before it was spun[100]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Anodyne Antidiarrhoeal Antirheumatic Astringent Demulcent Eczema Emollient Expectorant Haemostatic

Homeopathy Refrigerant VulneraryComfrey is a commonly used herbal medicine with a long and proven history in the treatment of various complaints. The root and the leaves are used, the root being more active, and they can be taken internally or used externally as a poultice[4, 222]. Comfrey is especially useful in the external treatment of cuts, bruises, sprains, sores, eczema, varicose veins, broken bones etc, internally it is used in the treatment of a wide range of pulmonary complaints, internal bleeding etc[4, 238, K]. The plant contains a substance called 'allantoin', a cell proliferant that speeds up the healing process[4, 21, 26, 165, 222, 238]. This substance is now synthesized in the pharmaceutical industry and used in healing creams[238]. The root and leaves are anodyne, astringent (mild), demulcent, emollient, expectorant, haemostatic, refrigerant, vulnerary[4, 21, 26, 165, 222]. Some caution is advised, however, especially in the internal use of the herb. External applications and internally taken teas or tinctures of the leaves are considered to be completely safe, but internal applications of tablets or capsules are felt to have too many drawbacks for safe usage[238]. See also the notes above on toxicity. The leaves are harvested in early summer before the plant flowers, the roots are harvested in the autumn. Both are dried for later use[238]. A homeopathic remedy is made from the fresh root, harvested before the plant flowers[232]. This has a very limited range of application, but is of great benefit in the treatment of broken bones and eye injuries[232]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Symphytum officinale for blunt injuries (see [302] for critics of commission E).

nrakta Europe, including Britain, south and east from Scandinavia to Spain, Siberia and Turkey. ksacta Damp, often shady localities, in meadows, woods etc, especially near streams and rivers[9, 17, 244].

propta Seed - sow spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. If you have sufficient seed you can try an outdoor sowing in situ in the spring. Division succeeds at almost any time of the year. Simply use a spade to chop off the top 7cm of root just below the soil level. The original root will regrow and you will have a number of root tops, each of which will make a new plant. These can either be potted up or planted out straight into their permanent positions.

nwatta Landscape Uses:Border, Ground cover, Specimen. Tolerates most soils and situations but prefers a moist soil and some shade[1, 4]. Grows well in heavy clay soils. Best grown in an open sunny site in a deep rich soil if it is being grown for compost material[200]. Plants can be invasive, often spreading freely by means of self-sown seed. The root system is very deep and difficult to eradicate, even small fragments of root left in the soil can produce new plants. Special Features:Attractive foliage, Edible, Fragrant foliage, Not North American native, Invasive, Naturalizing. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2]. The root pattern is fleshy. Thick or swollen - fibrous or tap root [1-2].

4.2.87 Ribes aciculare

3 tin 7 cyuc 3 kcaak 0 tcan 0 dwat 1 m hkuc
hmimhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikkwis
hpa7tmwatli xre7t hjonli

drutta Ribes aciculare is a deciduous Shrub growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to

tcanta DyeA green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168]. An excellent windbreak hedgerow. Plants produce suckers freely. A true bush cherry, easy to protect fruit from predating birds. Partially Self-Pollinating/Self-Fertile - will produce better fruit in terms of yields and quantity when planted with other varieties of Nanking Cherries. Flowers: Beautiful pinkish - white fragrant flowers attract a lot of beneficial insects.

dwatta Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta E. Asia - N. and W. China to the Himalayas. ksacta Slopes and in ravines, 1700 - 2400 metres in the Himalayas[145]. Forest on mountain slopes, forest margins, thickets and meadows at elevations of 100 - 3700 metres[266].

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200]. Softwood cuttings from strongly growing plants in spring to early summer in a frame[200]. Layering in spring.

nwatta Thrives in a well-drained moisture-retentive loamy soil, growing well on limestone[11, 200]. Prefers some lime in the soil but is likely to become chlorotic if too much lime is present[1]. Grows well in partial shade[31], though it fruits better when in a sunny position[11, 200]. Requires a sheltered position[11]. Thrives in hot summers[188]. Cultivated in Asia for its edible fruits, there are some named varieties[58, 183]. The fruits are not freely borne in Britain[11]. The flowers are produced on the previous years growth[182]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. Plants in this genus are notably susceptible to honey fungus[200]. The plant is heat tolerant in zones 7 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is mistletemmed with multiple stems from the crown [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

4.2.85 Asclepias incarnata

Swamp Milkweed, Swamp Butterfly Weed, Marsh Milkweed 3 tin 8 cyuc 3 kcaak 3 tcan 2 dwat 1.2 m hkuc hmimhtut cyuti kyuctuphja7n hwicli hrasjlutnyikfrp hpa7tli flatprkrikwis hpa7tmwatli fyfxre7t hjonli

drutta Asclepias incarnata is a PERENNIAL growing to 1.2 m (4ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to August, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects, Lepidoptera (Moths and Butterflies). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry moist or wet soil.

pista Although no specific reports have been seen for this species, many, if not all, members of this genus contain toxic resinoids, alkaloids and cardiac glycosides[274]. They are usually avoided by grazing animals[274]. The leaves and the stems might be poisonous[20].

kcakta Edible Parts: Flowers Leaves Oil SeedpodEdible Uses: Oil SweetenerUnopened flower buds - cooked[46, 61, 161]. Tasting somewhat like peas[85]. They can also be dried and stored for later use[183]. Young shoots - cooked. An asparagus substitute[85, 106]. Tips of older shoots are cooked like spinach[85]. Young seed pods, harvested when 3 - 4 cm long - cooked. A pea-like flavour, they are very appetizing[85]. The flower clusters can be boiled down to make a sugary syrup[85].

tcanta Fibre Latex Oil Pollution Stuffing WaxA good quality fibre is obtained from the bark[46, 57, 61, 95, 112, 169]. It is used in twine, cloth etc[112]. It is easily harvested in late autumn, after the plants have died down, by simply pulling it off the dead stems[112]. The seed floss is used to stuff pillows etc or is mixed with other fibres to make cloth[57, 171]. It is a Kapok substitute, it is used in Life Jackets or as a stuffing material[169, 171]. It is very water repellent. The floss has also been used to mop up oil spills at sea. Rubber can be made from latex contained in the leaves and stems[57]. Pods contain an oil and a wax which are of potential importance[171]. The dogbane-milkweed family Asclepias, Apocynum, Calotropis, and Trachomitum spp) has been used for fiber industrial crops for millennia with a number in cultivation as regional crops. All of these crops are dual-purpose fibres, offering bast fibres from the stem and seed finer or 'floss' in the fruit pods. Many have also been identified as potential hydrocarbon crops due to high latex content. Could be integrated into various agroforestry systems rather than as monocultures [1-1].

dwatta Anthelmintic Carminative Diuretic Emetic Laxative StomachicA tea made from the roots is anthelmintic, carminative, diuretic, emetic, strongly laxative and stomachic[4, 61, 222, 257]. The tea is said to remove tapeworms from the body in one hour[257]. It has also been used in the treatment of asthma, rheumatism, syphilis, worms and as a heart tonic[4, 207, 222]. An infusion of the roots is used as a strengthening bath for children and adults[257].

nrakta N. America - Quebec to Manitoba and Wyoming, south to Texas and New Mexico. ksacta Swamps, wet thickets and shores[43].

propta Seed - best sown in a greenhouse as soon as it is ripe in the autumn or in late winter[134, 169]. We have also had good results from sowing the seed in the greenhouse in early spring[K], though stored seed might need 2 - 3 weeks cold stratification[134]. Germination usually takes place in 1 - 3 months at 18°C[134]. As soon as the seedlings are large enough to handle, prick them out into individual pots and grow them on in the greenhouse for their first winter. Plant out when they are in active growth in late spring or early summer and give them some protection from slugs until they are growing away strongly. Division in spring. With great care since the plant resents root disturbance. Pot the divisions up and place them in a lightly shaded position in the greenhouse until they are growing away strongly, then plant them out in the summer, giving them some protection from slugs until they are established. Basal cuttings in late spring. Use shoots about 10cm long with as much of their white underground stem as possible. Pot them up individually and place them in a lightly shaded position in a greenhouse until they are rooting and growing actively. If the plants grow sufficiently they can be put into their permanent positions in the summer, otherwise keep them in the greenhouse until the following spring and when they are in active growth plant them out into their permanent positions. Give them some protection from slugs until they are established.

nwatta Experimental Crop Industrial Crop: Hydrocarbon Management: HayLandscape Uses:Border, Foundation, Massing. Prefers a well-drained light rich or peaty soil[1, 200]. Requires a moist soil and a sunny position, doing well by water[111, 134]. Succeeds on dry soils and on all soil types[112]. Plants are hardy to at least -25°C[187]. A very ornamental plant[1], the flowers are very attractive to butterflies[169]. The flower of many members of this genus can trap insects between its anther cells, the struggles of the insect in escaping ensure the pollination of the plant[207]. Many members of this genus seem to be particularly prone to damage by slugs. The young growth in

the young roots[257]. Plants produce chemicals which can inhibit the growth of other plants. These chemicals are dissolved out of the leaves when it rains and are washed down to the ground below, reducing the growth of plants under the tree[18, 20, 159]. The roots of this species produce substances that are toxic to many plant species, especially apples (Malus species), members of the Ericaceae, Potentilla spp and the white pines (certain Pinus spp.)[200, 201]. Wood - coarse-grained, light, soft, not strong, very attractive[46, 61, 82, 117]. It weighs 25lb per cubic foot[235]. It is not as valuable a crop as the black walnut (J. nigra), but is used indoors for furniture, doors etc[229]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Astringent Cholagogue Dysentery Febrifuge Laxative Odontalgic StomachicButternut was used by various native North American Indian tribes as a laxative and tonic remedy to treat a variety of conditions including rheumatic and arthritic joints, headaches, dysentery, constipation and wounds[254]. In modern herbalism it is considered to be a valuable remedy for chronic constipation, gently encouraging regular bowel movements. It is especially beneficial when combined with a carminative herb such as Angelica archangelica[254]. The quills or inner bark are one of the few potent laxatives that are safe to use in pregnancy [301]. Butternut also lowers cholesterol levels and promotes the clearance of waste products by the liver[254]. An infusion of the inner-bark is used as a cholagogue, febrifuge, mild laxative and stomachic[4, 46, 61, 82, 159, 165, 213, 222]. It is effective in small doses without causing cramps[222]. The bark is best collected in the autumn[213]. Best collected in late spring according to another report[4]. An infusion of the dried outer bark is used in the treatment of toothache and dysentery[226]. The oil from the nuts is used in the treatment of tapeworms and fungal infections[4, 222].

nrakta Eastern N. America - New Brunswick to Georgia, west to Arkansas and North Dakota. ksacta Usually found in rich moist soils of woods and river terraces[43, 82], but it also grows on dry rocky soils, especially if these are on limestone[226].

propta The seed is best sown as soon as it is ripe in individual deep pots in a cold frame[80]. You need to protect it from mice, birds, squirrels etc. The seed usually germinates in late winter or the spring. Plant out the seedlings into their permanent positions in early summer and give some protection from the cold for their first winter or two. The seed can also be stored in cool moist conditions (such as the salad compartment of a fridge) over the winter and sown in early spring but it may then require a period of cold stratification before it will germinate[78, 80].

nwatta Management: Standard Regional Crop Staple Crop: Protein-oilLandscape Uses:Specimen. Requires a deep well-drained loam and a position sheltered from strong winds[1, 11]. Prefers a slightly alkaline soil[200]. Prefers a sandy soil with a pH around 6 to 7[160]. Dislikes compacted soils or clay sub-soils, otherwise trees grow well on most soils[160]. This is the most cold-resistant of the walnuts[117], tolerating temperatures down to about -35°C in N. America when fully dormant[160]. It is less hardy in Britain, unfortunately, because the wood does not ripen so well here due to our cooler summers. The young growth in spring can be damaged by late frosts[200]. Sometimes cultivated in N. America for its edible seed, there are some named varieties[63, 117, 183]. Trees can come into bearing in 6 - 10 years from seed and fruiting is usually biennial[160]. The trees are quite short-lived, seldom exceeding 80 - 90 years[229]. They require about 105 frost-free days in order to ripen a crop in N. America[160]. Unfortunately, they have not proved successful as a nut tree in Britain, usually failing to produce a crop[11]. This is probably due to our cooler summers[11]. It is sometimes planted as a timber tree in Denmark and Rumania[50]. Plants produce a deep taproot and are intolerant of root disturbance. Seedlings should be planted out into their permanent positions as soon as possible and given some protection for their first few winters since they are somewhat tender when young[1, 11]. Trees cast a dense shade which reduces the amount of species able to grow below them[201]. We have no specific information for this species, but the roots of several members of this genus produce substances that are toxic to many plant species, especially apples (Malus species), members of the

Ericaceae, Potentilla spp and the white pines (certain Pinus spp.)[200]. The leaves of many species also secrete substances that have an inhibitory affect on plants growing underneath them. All in all this is not a very good companion plant[K]. Plants should only be pruned when they are fully dormant in winter or when they are in full leaf, otherwise any cuts will bleed profusely[200]. Hybridizes with J. ailantifolia, there are some named varieties of this hybrid that are grown for their edible seed[160]. Special Features:North American native, Inconspicuous flowers or blooms. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

4.2.52 Vitis aestivalis argentifolia

Summer Grape

3 tin 7 cyuc 3 kcaak 0 tcan 0 dwat 25 m hkuc hmimhtut cyuti kyuctup hwicli hrasjlutnyik hpa7tli flat-priklwis hpa7tmwatli xre7t hjonli

drutta Vitis aestivalis argentifolia is a deciduous Climber growing to 25 m (82ft 0in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from June to July, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Fruit Leaves SapEdible Uses: Fruit - raw, cooked in jellies, jams, pies etc or dried for later use[1, 2, 22, 46, 183]. Sweet and agreeably flavoured[2, 183]. The taste is best after a frost[101].The dried fruits are eaten as snacks or used in baked goods[183]. The fruit is about 8mm in diameter[200]. Leaves - cooked[55, 159]. Young leaves are wrapped around other foods and then baked, they impart a pleasant flavour. A sweet watery sap is obtained from the stem[101, 183]. Used as a refreshing drink. Young tendrils - raw or cooked[55, 85, 159].

tcanta DyeA yellow dye is obtained from the fresh or dried leaves[168].

nrakta Southern and Eastern N. America - Ontario to Alabama. Locally naturalized in Europe[50]. ksacta Dry woods and thickets[43].

propta Seed - best sown in a cold frame as soon as it is ripe[K]. Six weeks cold stratification improves the germination rate, and so stored seed is best sown in a cold frame as soon as it is obtained. Germination should take place in the first spring, but sometimes takes another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant out in early summer. Cuttings of mature wood of the current seasons growth, December/January in a frame. These cuttings can be of wood 15 - 30cm long or they can be of short sections of the stem about 5cm long with just one bud at the top of the section. In this case a thin, narrow strip of the bark about 3cm long is removed from the bottom half of the side of the stem. This will encourage callusing and the formation of roots. Due to the size of these cuttings they need to be kept in a more protected environment than the longer cuttings. Layering.

nwatta Prefers a deep rich moist well-drained moderately fertile loam[1, 200]. Grows best in a calcareous soil[200]. Succeeds in sun or partial shade though a warm sunny position is required for the fruit to ripen[200]. Plants climb by means of tendrils[182]. The flowers are sweetly scented with the aroma of mignonette[245]. Any pruning

should be carried out in winter when the plants are dormant otherwise they bleed profusely[182, 200]. This subspecies has a more northerly and inland range than the type and might therefore be more suitable for fruit production in Britain (particularly the northern provenances). Plants in this genus are notably susceptible to honey fungus[200].

4.2.53 Quercus rubra

Red Oak, Northern red oak
 3 tin 7 cyuc 3 kcaak 3 tcan 2 dwat 25 m hkuc
 hmimhtut cyutli kyuctcup hwicli jlutnyikfrp hpa7tli flatprik-
 wis hpa7tmwatli hjonli

drutta Quercus rubra is a deciduous Tree growing to 25 m (82ft) by 18 m (59ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from April to May, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate strong winds but not maritime exposure.

kcaakta Edible Parts: SeedEdible Uses: CoffeeSeed - cooked[161, 177, 257]. A staple food for several native North American Indian tribes[257]. Up to 3cm long[200]. It can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed contains bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost[183]. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute.

tcanta Dye Repellent Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. Oak galls are excrecences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. Tannin is obtained from the bark[82, 171]. A reddish-brown dye can be obtained from the bark[257]. Wood - coarse-grained, hard, strong, heavy, not durable[46, 82, 171, 226]. It weighs 41lb per cubic foot[235]. An important lumber source in America, it is highly valued for flooring, furniture, veneer, construction etc[46, 82, 171, 226].

dwatta Antidiarrhoeal Antiseptic Antiviral Astringent Cancer Dysentery Emetic Febrifuge Salve TonicThe bark and inner bark is antiseptic, astringent, emetic, febrifuge and tonic[257]. It is used in the treatment of diarrhoea, chronic dysentery, indigestion, asthma, severe coughs, hoarseness, intermittent fevers, bleeding etc[222, 257]. Externally, it is used as a wash for skin eruptions, rashes, burns etc[222, 257]. The bark can be chewed as a treatment for mouth sores[257]. The bark contains tannins, experimentally these have been shown to be antiviral, antiseptic, anticancer and also carcinogenic[222]. Any galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta Eastern N. America - Nova Scotia to Georgia, west to Oklahoma and Minnesota. ksacta Dry or upland woods[43]. Found in a variety of soils, it grows best in those that are deep and fine textured, and the largest trees are found in protected ravines or on sheltered slopes[229].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their

permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Prefers a good deep fertile loam which can be on the stiff side[11]. Lime tolerant[188]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. Prefers a hotter summer than is usually experienced in Britain[200], but trees still grow well in Britain[11, 200]. A fairly fast-growing tree[188], it is cultivated for its timber in C. Europe. Trees normally require 20 - 25 years to reach flowering size, and may take another 20 years before heavy crops of seed are produced[229]. Seed production is cyclic, heavy crops being produced every 2-5 years in the wild[229]. The tree flowers on new growth produced in spring, the seed taking two summers to ripen[229]. Trees are able to regenerate from root suckers if the top is killed by a forest fire[226]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200].

4.2.54 Betula lenta

Cherry Birch, Sweet birch, Black Birch, Cherry Birch
 3 tin 7 cyuc 3 kcaak 4 tcan 3 dwat 24 m hkuc
 hmimhtut cyutli tcup hwicli hrasjlutnyikfrp hpa7tli frusflat-
 prikwis hpa7tmwatli hjonli

drutta Betula lenta is a deciduous Tree growing to 24 m (78ft 9in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in April, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The essential oil obtained from the bark contains 97 - 99% methyl salicylate. This is very toxic when taken orally, and it can also be absorbed through the skin, resulting in human fatalities. As little as 4, 700 mg can be fatal in children[269]. The aromatic and aliphatic hydrocarbons in birch tar are irritating to the skin. Do not use in patients with oedema or with poor kidney or heart functions [301]

kcaakta Edible Parts: Inner bark SapEdible Uses: Condiment Sweetener Tealinner bark - cooked or dried and ground into a powder[4, 62, 102]. Sweet and spicy[177]. The dried inner bark can be used as a thickener in soups etc or can be added to flour when making bread etc. Inner bark is generally only seen as a famine food, used when other forms of starch are not available or are in short supply[K]. Sap - raw or cooked[2, 46, 102]. A sweet flavour[61, 177]. It is harvested in early spring, before the leaves unfurl, by tapping the trunk. The flow is best on sunny days following a heavy frost. A delicious drink, it can also be concentrated into a syrup or sugar[183]. The sap can be fermented to make birch beer or vinegar[183]. An old English recipe for the beer is as follows: "To every Gallon of Birch-water put a quart of Honey, well stirr'd together; then boil it almost an hour with a few Cloves, and a little Limon-peel, keeping it well scumm'd. When it is sufficiently boil'd, and become cold, add to it three or four Spoonfuls of good Ale to make it work...and when the Test begins to settle, bottle it up . . . it is gentle, and very harmless in operation within the body, and exceedingly sharpens the Appetite, being drunk ante pastum."[269]. The dried leaves and bark from the larger roots are a delightful tea substitute[177, 183]. A wholesome, agreeable tea is made from the essential oil contained in the inner bark and twigs[21, 55, 62]. This essential oil is also used as a winter-gren flavouring in foods[183].

tcanta Essential Fuel Tannin WoodAn essential oil is obtained from the bark and twigs, it is distilled in quantity and is an item of commerce[235]. It can be used medicinally, as a food flavouring, as an ingredient in cosmetic shampoos and also to make a wholesome tea[11, 21, 46, 171, 269]. The oil, when decolourised, is similar to 'Oil of Wintergreen' (obtained from Gaultheria procumbens) and is considered to be of superior quality[245]. The tree is coppiced every 5 years

June to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcaakta Edible Parts: Fruit StemEdible Uses: TeaFruit - raw or cooked in pies, preserves etc[1, 2, 3, 34, 85, 101, 183]. Young shoots - harvested as they emerge through the ground in the spring, peeled and eaten raw or cooked like asparagus[85, 101, 161, 183]. The leaves and twigs are used as a tea substitute[161, 183].

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

dwatta Antiemetic Astringent Birthing aid Cardiac Decongestant Oxytoxic Refrigerant StimulantAntiemetic[13, 165]. The leaves and roots are anti-inflammatory, astringent, decongestant, ophthalmic, oxytoxic and stimulant[4, 13, 165, 222, 254]. A tea made from them is used in the treatment of diarrhoea, as a tonic for the uterus to strengthen pregnant women, and as an aid in childbirth[4, 222, 257]. The tea has also been shown as effective in relieving painful menstrual cramps[222]. The active ingredients both stimulate and relax the uterus[222]. They can be used during the last three months of pregnancy and during childbirth, but should not be used earlier[238]. Externally, the leaves and roots are used as a gargle to treat tonsillitis and mouth inflammations, as a poultice and wash to treat sores, conjunctivitis, minor wounds, burns and varicose ulcers[238, 257]. The leaves are harvested in the summer and dried for later use[9]. The fruit is anticorbatic and diuretic[7]. Fresh raspberry juice, mixed with a little honey, makes an excellent refrigerant beverage to be taken in the heat of a fever[21]. Made into a syrup, it is said to have a beneficial effect on the heart[21].

nrakta N. America - Newfoundland to British Columbia, south to New Mexico. ksacta Thickets, clearings and woodland borders[204]. In dry or rocky situations[235].

propta Seed - requires stratification and is best sown in early autumn in a cold frame. Stored seed requires one month stratification at about 3°C and is best sown as early as possible in the year. Prick out the seedlings when they are large enough to handle and grow on in a cold frame. Plant them out into their permanent positions in late spring of the following year. Cuttings of half-ripe wood, July/August in a frame[200]. Tip layering in July. Plant out in autumn. Division in early spring or just before leaf-fall in the autumn[200].

nwatta Easily grown in a good well-drained loamy soil in sun or semi-shade[1, 11, 200]. A parent of some of the cultivated raspberries[11, 34], it is often used in modern breeding programmes[119]. This species has biennial stems, it produces a number of new stems each year from the perennial rootstock, these stems fruit in their second year and then die[200]. Plants in this genus are notably susceptible to honey fungus[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a running thicket former forming a colony from shoots away from the crown spreading indefinitely [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

4.2.83 Campanula latifolia

Large Campanula, Giant bellflower
 3 tin 7 cyuc 3 kcaak 0 tcan 1 dwat 1.5 m hkuc
 pcmhmm cyutli kyuctcup hwicli hrasjlutnyikfrp hpa7tli prikwis hpa7tmwatli fyfxre7t hjonli

drutta Campanula latifolia is a PERENNIAL growing to 1.5 m (5ft) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers dry or moist soil.

kcaakta Edible Parts: Flowers Leaves RootEdible Uses: Young shoots - raw or cooked[5, 177]. Contains up to 400mg% of vitamin C[174]. Root - raw[74]. This report is rather vague and needs further investigation. Flowers - raw or cooked. A pleasant sweetness[K].

dwatta Emetic Vitamin CThe flowers are emetic[61]. nrakta Much of Europe, including Britain, north to Norway east to Siberia and W. Asia. ksacta Woodlands, lush meadows and hedgerows, frequently on slightly acid soils[1, 5, 31, 271].

propta Seed - surface sow in spring in a cold frame. Three or four weeks pre-chilling of the seed improves the germination rate[138]. The seed usually germinates in 2 - 4 weeks at 18°C[138]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. The seed can also be sown outdoors in situ during the spring. Basal cuttings in spring[1]. Harvest the shoots when they are about 10 - 15cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer. Division in spring or autumn[111]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the summer or following spring.

nwatta A very robust plant, capable of succeeding in the wild garden and tolerating considerable neglect[271]. It succeeds in most fertile well-drained soils[233], though it prefers a moist but well-drained rich sandy loam and a neutral or alkaline soil in sun or partial shade[1, 200]. Prefers a humus-rich soil in shade or partial shade[271]. Grows well in cool moist woodlands with light shade where it can spread freely[1]. Plants occasionally grow in old walls[219] and also succeed in the dry shade of trees[233]. Plants are hardy to at least -15°C[200]. The species in this genus do not often hybridize and so seed can generally be relied upon to come true[221]. The plants are self-fertile[221]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. A very ornamental plant, there are some named varieties[187]. The species can be quite invasive, though most of the cultivars that have been selected for flower colour are less rampant[271].

4.2.84 Prunus tomentosa

Nanking Cherry
 3 tin 9 cyuc 3 kcaak 2 tcan 1 dwat 1.5 m hkuc
 hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikwis
 hpa7tmwatli xre7t hjonli

drutta Prunus tomentosa is a deciduous Shrub growing to 1.5 m (5ft) by 2 m (6ft). See above for USDA hardiness. It is hardy to UK zone 2. It is in flower from March to April, and the seeds ripen in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcaakta Edible Parts: Fruit Leaves SeedEdible Uses: Fruit - raw or cooked[2, 105]. Juicy, sub-acid to sweet[22, 46, 61, 183]. The unripe fruits can be pickled[177, 183]. The fruit is about 12mm in diameter and contains one large seed[200]. Seed - raw or cooked. Do not eat the seed if it is too bitter - see the notes above on toxicity. The buds are cooked and eaten[183]. (Is this the flower or leaf buds?)

4.2.80 Rubus odoratus

Thimbleberry, Purpleflowering raspberry
3 tlin 7 cyuc 3 kcaak 3 tcan 2 dwat 2.5 m hkuc
hmmihtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikklwis
hpa7tmwatli xre7t hjonli

drutta Rubus odoratus is a deciduous Shrub growing to 2.5 m (8ft) by 2.5 m (8ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from June to September, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 161, 257]. Somewhat tart and dry[2], it is usually cooked and used in pies, jellies, preserves etc[183]. The fruit can be dried for later use[257]. This species rarely fruits well in Britain, probably due to our cooler summers[11].

tcanta DyeA purple to dull blue dye is obtained from the fruit[168]. Plants are very vigorous and can be grown as a tall ground cover for large areas[208].

dwatta Astringent Diuretic Dysentery Kidney Odontalgic Salve StomachicThe leaves are highly astringent[207]. They are used in the treatment of dysentery and diarrhoea[238]. The leaves have been used as a wash for old and foul sores, boils etc[257]. A decoction or infusion of the branches has been used to settle the stomach[257]. A decoction of the leaves and stems has been used to treat kidney complaints[257]. The root is astringent. A decoction of the root or the root bark has been used as a treatment for diarrhoea and colds[257]. The root has been used in the treatment of toothaches[257]. The berries have been used as a diuretic[257].

nrakta Eastern N. America - Quebec to Ontario and south to Tennessee. Occasionally naturalized in Britain. ksacta Moist thickets and woodland borders[43].

propta Seed - requires stratification, is best sown in early autumn in a cold frame. Sow stored seed as early as possible in the year in a cold frame and stratify for a month at 3°C if sowing later than February. Prick out the seedlings when they are large enough to handle and grow on in a cold frame. Plant them out into their permanent positions in late spring of the following year. Tip layering in July. Plant out in autumn. Division in early spring.

nwatta Easily grown in a good well-drained loamy soil in sun or semi-shade[1, 11, 200]. Grows well in a sandy soil but does not like clay[182]. Prefers a semi-shaded position. Does well in a woodland garden though it is less likely to fruit well in such a position. A very ornamental plant[1], it is hardy to about -30°C[184]. The glandular hairs on the stems have a powerful resinous scent somewhat like cedarwood[245]. A vigorous suckering shrub, it has perennial stems without prickles[200]. Plants in this genus are notably susceptible to honey fungus[200]. The plant is heat tolerant in zones 7 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

4.2.81 Rubus parviflorus

Thimbleberry
3 tlin 7 cyuc 3 kcaak 3 tcan 3 dwat 2.5 m hkuc
hmmihtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikklwis
hpa7tmwatli xre7t hjonli

drutta Rubus parviflorus is a deciduous Shrub growing to 2.5 m (8ft) by 2 m (6ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower in June, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers Fruit StemEdible Uses: Fruit - raw or cooked[62, 101, 118, 183]. It makes excellent jams and preserves[257]. The fruit can also be dried for later use[183]. A sweet and pleasant flavour[2, 85, 94] though this is not always properly developed in the cooler summers of Britain[11]. The fruit is very seedy[155]. Rich in vitamin C[183]. The hemispherical fruit is about 20mm in diameter[200]. Young shoots - peeled and eaten cooked or raw[2, 85, 101, 118, 172]. The shoots are harvested as they emerge in the spring, and whilst they are still young and tender[161, 183]. They can be cooked like asparagus[257]. The shoots are rich in vitamin C[183]. Flowers - raw[172].

tcanta Dye Lining SoapThe leaves are used to line baskets etc for carrying soft fruit or other delicate items[99, 118]. Plants are very vigorous and can be grown as a tall ground cover for large areas[208]. A soap is obtained from the boiled bark[99, 118, 257]. A purple to dull blue dye is obtained from the fruit[168].

dwatta Antiemetic Antiphlogistic Appetizer Astringent Blood tonic Dysentery Poultice Salve Stomachic Tonic Vitamin C Women's complaintsThe leaves are antiemetic, astringent, blood tonic and stomachic[172, 257]. An infusion is used internally in the treatment of stomach complaints, diarrhoea and dysentery, anaemia, the spitting up of blood and to treat vomiting[238, 257]. An infusion has been taken by women when their periods are unusually long[257]. A poultice of the dried powdered leaves has been used to treat wounds and burns[257]. The leaves have been crushed and rubbed over the skin to treat pimples and blackheads[257]. A poultice of the leaf ashes, mixed with oil, has been used to treat swellings[257]. The young shoots are alterative and antiscorbutic[257]. The roots are appetizer, astringent, stomachic and tonic[172, 257]. An infusion has been used by thin people to help them gain weight[257]. An infusion has also been used in the treatment of stomach disorders, diarrhoea and dysentery[238, 257]. A decoction of the roots has been taken in the treatment of pimples and blackheads[257].

nrakta Western N. America - Alaska to Ontario and California. Occasionally naturalized in Britain[17]. ksacta Woodlands, canyons and open areas[62].

propta Seed - requires stratification, is best sown in early autumn in a cold frame. Sow stored seed as early as possible in the year in a cold frame and stratify for a month at 3°C if sowing later than February. Prick out the seedlings when they are large enough to handle and grow on in a cold frame. Plant them out into their permanent positions in late spring of the following year. Tip layering in July. Plant out in autumn. Division in early spring.

nwatta Easily grown in a good well-drained loamy soil in sun or semi-shade[1, 11, 200]. Can be grown in a woodland garden though it is less likely to fruit well in such a position[K]. This plant has perennial stems without prickles[200] and is less invasive than the related R. odoratus[182]. Plants in this genus are notably susceptible to honey fungus[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

4.2.82 Rubus strigosus

American Red Raspberry, Grayleaf red raspberry
3 tlin 7 cyuc 3 kcaak 1 tcan 3 dwat 2 m hkuc
hmmihtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikklwis
hpa7tmwatli fyixre7t hjonli

drutta Rubus strigosus is a deciduous Shrub growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from

and all parts are distilled for the oil[245]. The tree grows up to 3 metres tall in this 5 year period[245]. The greatest yield of oil is obtained if the tree is harvested in the summer[245]. The oil distilled from the wood is insect repellent[269]. The bark contains up to 16% tannin[223]. The thin outer bark is waterproof and has been used as the outer cladding on dwellings, canoes etc[257]. It has also been used to make baskets, dishes, buckets etc[257]. Wood - very strong, close grained, hard, heavy. The wood is richly marked[4], it weighs 40lb per cubic foot and is exploited commercially for making floors, furniture, tools etc[11, 46, 61, 82, 171, 229]. It makes an excellent fuel[11, 46, 61, 229]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Analgesic Anthelmintic Antiinflammatory Antiseborrhoeic Astringent Diaphoretic Diuretic Dysentery Rubefacient Stimulant UrinaryThe bark is anthelmintic, astringent, diaphoretic, diuretic and stimulant[4, 21]. A tea made from the bark is used in the treatment of fevers, stomach aches and lung ailments[222, 257], it is said to be an excellent tonic in cases of dysentery and to be useful in the treatment of gravel and female obstructions[4]. An essential oil distilled from the bark is anti-inflammatory, analgesic and rubefacient[222]. It is used in the treatment of rheumatism, bladder infections, neuralgia etc[222]. The oil, called 'oil of wintergreen', used to be produced commercially, but it is now manufactured synthetically[222]. A tea made from the twigs is used in the treatment of fevers[222]. The leaves can be chewed or used in an infusion in the treatment of dysentery[257]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve *Betula* species for infections of the urinary tract, kidney and bladder stones, rheumatism (see [302] for critics of commission E).

nrakta Eastern N. America - Quebec to Georgia, west to Alberta and Ohio. ksacta Rich woodlands, preferring north-facing slopes and moist soils[43, 62]. It is also found on rocky soils[229].

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

nwatta Landscape Uses:Specimen, Woodland garden. An easily grown plant, it succeeds in a well-drained loamy soil in a sheltered position[11, 200]. Grows well in heavy clay soils. Dislikes wet soils[200]. Shade tolerant[200]. Cherry birch is said to tolerate an annual precipitation of ca 60 to 150cm, an average annual temperature range of 5 to 12°C, and a pH of 4.5 to 7.5[269]. Hybridizes freely with other members of this genus[50]. The bruised foliage has a strong smell of wintergreen[200]. A good plant to grow near the compost heap, aiding the fermentation process[20]. Trees can be coppiced on a cycle of 5 years or more[245]. Trees are notably susceptible to honey fungus[200]. Special Features: Attracts birds, North American native, Inconspicuous flowers or blooms. The plant is heat tolerant in zones 7 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. The root

pattern is a heart root, dividing from the crown into several primary roots going down and out [1-2].

4.2.55 Acer negundo

Box Elder
3 tlin 8 cyuc 3 kcaak 3 tcan 1 dwat 21 m hkuc
hmmihtut cyutli tcup hwicli hrasjlutnyikfirp hpa7tli flatprikklwis hpa7tmwatli nyanhjen hjonli

drutta Acer negundo is a deciduous Tree growing to 21 m (69ft) by 8 m (26ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 2. It is in flower from April to May, and the seeds ripen from September to October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

kcakta Edible Parts: Inner bark Leaves Sap SeedEdible Uses: SweetenerThe sap contains a reasonable quantity of sugar and can be used as a refreshing drink or be concentrated into a syrup[11, 46, 61, 82, 159]. The syrup is used as a sweetener on many foods. The sugar content is inferior to *A. saccharum* according to one report[149] whilst another says that it is highly valued as a producer of sweet sap[183]. The sugar from the sap of this tree is said to be whiter than that from other maples[183]. To obtain the sap, bore a hole on the sunny side of the trunk into the sapwood about 1 metre above the ground at anytime from about January 1st until the leaves appear[85]. The flow is best on a warm day after a frost[213]. The best sap production comes from cold-winter areas with continental climates. Inner bark - raw or cooked. It can be dried, ground into a powder and then used as a thickener in soups etc or be added to cereal flours when making bread, cakes etc[257]. The inner bark can also be boiled until the sugar crystallizes out of it[257]. Self-sown seedlings, gathered in early spring, are eaten fresh or dried for later use[213]. Seeds - cooked. The wings are removed and the seeds boiled then eaten hot[213]. The seed is up to 12mm long and is produced in small clusters[82].

tcanta Musical Preservative Shelterbelt WoodThe leaves are packed around apples, rootcrops etc to help preserve them[18, 20]. A fairly wind-tolerant tree, it can be used in mixed plantings as a part of shelterbelt plantings[200]. Wood - soft, weak, light, close grained. It weighs 27lb per cubic foot[235]. Of little commercial value, it is used for boxes, cheap furniture, pulp, fuel etc[46, 61, 82, 149, 229]. Large trunk burls or knots have been used to make drums[257].

dwatta EmeticA tea made from the inner bark is used as an emetic[222, 257].

nrakta N. America - Nova Scotia to Florida, west to California and Manitoba. ksacta Found in a variety of soil types, growing best in lowland sites along rivers, streams, ponds or seasonally flooded flats[229].

propta Seed - best sown as soon as it is ripe in a cold frame, it usually germinates in the following spring. Pre-soak stored seed for 24 hours and then stratify for 2 - 4 months at 1 - 8°C. It can be slow to germinate. The seed can be harvested 'green' (when it has fully developed but before it has dried and produced any germination inhibitors) and sown immediately. It should germinate in late winter. If the seed is harvested too soon it will produce very weak plants or no plants at all[80, 113]. When large enough to handle, prick the seedlings out into individual pots and grow them on until they are 20cm or more tall before planting them out in their permanent positions. Layering, which takes about 12 months, is successful with most species in this genus. Cuttings of young shoots in June or July. The cuttings should have 2 - 3 pairs of leaves, plus one pair of buds at the base. Remove a very thin slice of bark at the base of the cutting, rooting is improved if a rooting hormone is used. The rooted cuttings must show new growth during the summer before being potted up otherwise they are unlikely to survive the winter. The cuttings of this species usually root easily. Budding onto *A. negundo* in early summer usually works well.

The bud should develop a small shoot in the summer otherwise it is unlikely to survive the winter.

nwatta Of easy cultivation, succeeding in most soils[202] but preferring a rich moist well-drained soil and a sunny position[11]. Grows well in heavy clay soils and in sandy soils[188]. Plants often become chlorotic on very alkaline soils[202]. Plants are hardy to about -18°C[202]. A fast growing but short-lived tree in the wild, living for 75-100 years[149, 229]. It is fairly wind-tolerant[200], but the branches have a tendency to break in strong winds[226]. This species is cultivated commercially in Illinois for its sap[183]. Another report says that this is one of the least productive species for sugar[226]. A very ornamental plant[1], there are several named varieties[200]. This tree is a bad companion plant that is said to inhibit the growth of neighbouring plants[18, 20]. This species is notably resistant to honey fungus[88, 200]. Very tolerant of pruning, it can regenerate from old wood if it is cut back hard[202]. Dioecious. Male and female plants must be grown if seed is required.

4.2.56 Quercus alba

White Oak, Hybrid oak

3 tin 9 cyuc 3 kcaak 4 tcan 2 dwat 20 m hkuc hmimhtut cyull kyuctup hwicli jltunykfrip hpa7tli flatprikwis hpa7tmwatli hjonli

drutta *Quercus alba* is a deciduous Tree growing to 20 m (65ft) by 10 m (32ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from April to May, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate strong winds but not maritime exposure.

kcaakta Edible Parts: SeedEdible Uses: CoffeeSeed - raw or cooked[226]. Somewhat sweet[229]. The seed is about 1 - 3cm long[200] and ripens in its first year[235]. It contains about 6% protein and 65% carbohydrates[213]. It is low in tannin and needs little if any leaching. It is said that those seeds with red or pink blotches on the shell are the sweetest[183]. Any bitter tannins can be leached out by thoroughly washing the dried and ground up seed in water, though many minerals will also be lost. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The seed can be roasted and then eaten, its taste is something like a cross between sunflower seeds and popcorn[183]. The roasted seed is a coffee substitute that is free from caffeine[226].

tcanta Fuel Repellent Tannin WoodAgroforestry Uses: White oak is potentially valuable for use in reforestation projects, and appears to have potential for use on other types of disturbed sites. It has been planted on strip-mined lands in Ohio, Indiana, and Illinois, and has exhibited good growth and survival on cast overburden and graded topsoil overlying mine spoils. It is well adapted to loamy and clayey spoils with a pH of 5.5 to 8.0[1050] Other Uses: The leaves of most species in this genus are more or less rich in tannins. A mulch of the leaves can be placed around vulnerable plants in order to repel slugs, snails, grubs etc. Fresh leaves should be used with caution, since these can utilize some of the nitrogen in the soil and this inhibit plant growth[20, K]. The bark is a rich source of tannin[171, 226]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. A brown dye is obtained from the bark or from the galls, it does not require a mordant[226]. Yellow, chrome and gold can also be obtained if mordants are used[226]. The wood is strong, very heavy, hard, tough, strong, close grained, durable[46, 82, 171, 213, 227]. It

weighs about 46lb per cubic foot[227]. When properly dried treated, the wood glues well, machines very well and accepts a variety of finishes One of the most important timbers in N. America, it is used for cabinet making, furniture, panelling, flooring, construction, mine props, agricultural tools etc[46, 82, 171, 213, 1050]. It is highly valued for making the staves of barrels for storing wine and liquor[274, 338]. The wood is a good fuel giving off a lot of heat[46, 1050]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Antiseptic Astringent Dysentery TonicWhite oak was often used medicinally by several native North American Indian tribes, who valued it especially for its antiseptic and astringent properties and used it in the treatment of many complaints[257]. It is little, if at all, used in modern herbalism. The inner bark contains 6 - 11% tannin, it has powerful antiseptic and astringent properties and is also expectorant and tonic[61, 102, 213, 257]. The bark is boiled and the liquid drunk in the treatment of bleeding piles and diarrhoea, intermittent fevers, coughs and colds, consumption, asthma, lost voice etc[213, 257]. The bark has been chewed as a treatment for mouth sores[257]. Externally, it is used as a wash for skin eruptions, burns, rashes, bruises, ulcers etc and as a vaginal douche[222, 257]. It has also been used as a wash for muscular pains[257]. The bark is best collected in the spring[213]. Any galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta Eastern N. America - Maine to Florida, west to Texas and Minnesota. **ksacta** Dry woods[43], gravelly ridges, sandy plains, rich uplands and moist bottoms[82]. The best specimens are found in deep rich well-drained loamy soils[229].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Landscape Uses:Firewood, Pest tolerant, Specimen, Street tree. Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Lime tolerant[188]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. The white oak prefers warmer summers than are usually experienced in Britain, trees often grow poorly in this country and fail to properly ripen their wood resulting in frost damage over the winter[200]. There are, however, a number of trees 20 metres tall in Britain, mainly in the south-east of the country[11]. Sometimes cultivated for its edible seed, there are some named varieties[183]. Trees take about 30 years before they start to bear good crops of seed, they then have heavy crops about every 3 years with light crops in the other years[227]. They continue to yield commercial crops for about 120 years[227]. The tree flowers on new growth produced in spring, the seed ripening in its first year[200, 229]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young, though they may require protection for the first winter or two[11]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200]. Special Features:Attracts birds, North American native, Inconspicuous flowers or blooms. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering

soil. The plant can tolerate strong winds but not maritime exposure.

kckakta Edible Parts: LeavesEdible Uses: TeaYoung leaves and shoots - raw or cooked[105]. An emergency food, it is only used when all else fails[177]. A refreshing herb tea is made from the flowers. A very good chocolate substitute is made from a paste of the ground fruits and flowers[2]. Trials on marketing the product failed because the taste decomposes readily[2].

tcanta FibreA fibre is obtained from the tough inner bark It can be made into diverse items such as mats, shoes and coarse cloth[229].

dwatta Antispasmodic Diaphoretic SedativeA tea made from the flowers is antispasmodic, diaphoretic and sedative[226].

nrakta E. Asia - N. China to Mongolia. **ksacta** Mountain slopes, 1300 - 2300 metres in China[109].

propta Seed - much of the seed produced in Britain is not viable, cut a few seedcases open to see if there is a seed inside[80]. If possible, obtain fresh seed that is ripe but has not as yet developed a hard seed coat and sow it immediately in a cold frame. It may germinate in the following spring though it could take 18 months[80]. Stored seed can be very slow to germinate. It has a hard seed coat, embryo dormancy and a hard coat on the pericarp. All these factors mean that the seed may take up to 8 years to germinate[80]. One way of shortening this time is to stratify the seed for 5 months at high temperatures (10°C at night, up to 30°C by day) and then 5 months cold stratification[80]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Layering in spring just before the leaves unfurl. Takes 1 - 3 years[78]. Suckers, when formed, can be removed with as much root as possible during the dormant season and replanted immediately[200].

nwatta Landscape Uses:Espalier, Screen, Specimen. Prefers a good moist loamy alkaline to neutral soil but succeeds on slightly acid soils[11, 200]. Grows poorly on any very dry or very wet soil[200]. Dislikes exposed positions according to one report[200], whilst another says that it is tolerant of exposure[125]. Succeeds in full sun or semi-shade[188]. Prefers a continental climate, growing more slowly and not producing fertile seed in areas with cool summers[200]. This species flourishes in Britain[11, 125]. Lime trees tend to hybridise freely if other members of the genus are growing nearby[238]. If growing plants from seed it is important to ensure the seed came from a wild source or from an isolated clump of the single species[K]. Grows best in a woodland situation, young plants tolerate a reasonable level of side shade[200]. Unlike most other members of this genus, this species does not usually become infested with aphid[125]. Quite tolerant of root disturbance, semi-mature trees up to 5 metres tall have been transplanted successfully. Plants in this genus are notably resistant to honey fungus[200]. Special Features:Not North American native, Fragrant flowers, Attractive flowers or blooms.

4.2.79 Epilobium angustifolium

Willow Herb

3 tin 7 cyuc 3 kcaak 2 tcan 2 dwat 2 m hkuc hmimhtut cyull kyuctup hwicli hrasjltunyk hpa7tli flatprikwis hpa7tmwatli xre7t hjonli

drutta *Epilobium angustifolium* is a PERENNIAL growing to 2 m (6ft) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista An infusion of the leaves is said to stupefy a person[4].

kckakta Edible Parts: Flowers Leaves Root StemEdible Uses: TeaLeaves and young shoot tips - raw or cooked[2, 5, 12, 62, 172, 183]. They can be used in salads or cooked as a

vegetable[9]. When boiled they make a wholesome vegetable and are a good source of vitamins A and C[2, 257]. Only use the leaves when they are young[85]. Although they are said to be edible, another report says that an infusion of them can stupefy[4]. Young shoots - cooked. They make a good asparagus substitute[2, 9, 183, 213]. Root - raw cooked or dried and ground into a powder[74, 172]. Used in spring, it has a sweet taste[12, 74]. Flower stalks - raw or cooked[85, 106, 172, 183]. Added to salads, they are used when the flowers are in bud[183]. The pith of young or older stems - raw or cooked[62, 99, 183]. Slightly sweet, tender and pleasing to eat, though there is not much of it[85, 172]. Gelatinous[161], it can be used as a flavouring in soups[183]. The stems are said to be a good laxative, but are best not eaten on an empty stomach[256]. A tea is made from the dried leaves[9, 62, 85, 94, 183], it is sweet and pleasant[172]. Called 'kaporie' tea in Russia, it contains 10% tannin[222]. The leaves are also used as an adulterant of China tea[2].

tcanta Fibre Stuffing Tinder Weather protectionA fibre obtained from the outer stems is used to make cordage[99, 207, 256]. The 'cottony' seed hairs are used as a stuffing material[99, 118] or as a tinder[106, 172]. The powdered inner cortex is applied to the hands and face to give protection from the cold[99, 172, 257].

dwatta Antiinflammatory Antispasmodic Astringent Demulcent Dysentery Emollient Hypnotic Laxative Poulitice TonicWillow herb is often used as a domestic herbal remedy, though it is little used in conventional herbalism. The herb is antispasmodic, astringent, demulcent, emollient, hypnotic, laxative and tonic[4, 7, 172, 192]. It is used in the treatment of diarrhoea, mucous colitis and irritable bowel syndrome[254]. The plant is used in Germany and Austria to treat prostate problems[254]. A poultice of the leaves is applied to mouth ulcers[222]. An extract of the leaves has anti-inflammatory activity[222]. An ointment made from the leaves has been used to soothe skin problems in children[254]. A tea made from the leaves and roots is a folk remedy for dysentery and abdominal cramps[222]. A poultice made from the peeled roots is applied to burns, skin sores, swellings, boils etc[222, 257].

nrakta Europe, including Britain, temperate Asia and N. America. **ksacta** Rocky ground, waste areas, woodland edges and gardens[7, 13].

propta Seed - sow early spring in situ or as soon as the seed is ripe[111]. This plant is more than capable of finding its own way into most gardens and does not usually require an invitation. Division in spring or autumn. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta An easily grown plant, it prefers a well-drained but moisture retentive soil in a sunny position[200], though it succeeds in most soils[1]. It prefers a moist soil[111], but also succeeds on dry banks[188]. It is best grown in open woodland[1]. Plants are hardy to at least -20°C[187]. The rosebay willowherb spreads vigorously by means of a creeping rhizome, and often forms large patches[187]. It is apt to become a weed especially through its seed which is very light and capable of travelling long distances in the wind. It is often one of the first plants to colonize disturbed areas such as scenes of fires[1, 200]. A very ornamental plant[1], it is the floral emblem of the Yukon[172]. A food plant for the caterpillars of several lepidoptera species[24], it is also a good bee plant[74, 94]. The plant is heat tolerant in zones 7 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

by some botanists[1, 17]. The leaves, when bruised, have a delicious fragrance[245]. The flowers are also fragrant. Grows well with alliums, parsley, mignonette and lupins[18, 20]. Garlic planted nearby can help protect the plant from disease and insect predation[18, 20]. Grows badly with box-wood[18]. Hybridizes freely with other members of this genus[80]. Plants in this genus are notably susceptible to honey fungus[200].

4.2.76 *Rubus allegheniensis*

Alleghany Blackberry, Graves' blackberry
3 tin 7 cyuc 3 ckak 1 tcan 2 dwat 3 m hkuc
hmimhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta *Rubus allegheniensis* is a deciduous Shrub growing to 3 m (9ft 10in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from May to July, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Apomictic (re-produce by seeds formed without sexual fusion). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit Stem Edible Uses: Fruit - raw, cooked or dried for later use[34, 101, 161, 257]. A pleasant sweet and somewhat spicy flavour[3, 159, 171, 183]. The fruit is about 12mm in diameter[200] and can be 3cm long[235]. Young shoots - raw. They are harvested in the spring, peeled and used in salads[183].

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

dwatta Antihæmorrhoidal Antirheumatic Astringent Diuretic Ophthalmic Stimulant TB Tonic UrinaryThe roots are antihæmorrhoidal, antirheumatic, astringent, stimulant and tonic[257]. An infusion can be used in the treatment of stomach complaints, diarrhoea, piles, coughs and colds, tuberculosis and rheumatism[257]. The infusion has also been used by women threatened with a miscarriage[257]. The root can be chewed to treat a coated tongue[257]. An infusion of the root has been used as a wash for sore eyes[257]. The leaves are astringent[257]. An infusion can be used in the treatment of diarrhoea[257]. An infusion of the bark has been used in the treatment of urinary problems[257]. A decoction of the stems has been used as a diuretic[257].

nrakta Eastern N. America - Nova Scotia to Ontario, New York, Virginia and North Carolina. ksacta Dry thickets, clearings and woodland margins[43].

propta Seed - requires stratification and is best sown in early autumn in a cold frame. Stored seed requires one month stratification at about 3°C and is best sown as early as possible in the year. Prick out the seedlings when they are large enough to handle and grow on in a cold frame. Plant them out into their permanent positions in late spring of the following year. Cuttings of half-ripe wood, July/August in a frame[200]. Tip layering in July. Plant out in autumn. Division in early spring or just before leaf-fall in the autumn[200].

nwatta Easily grown in a good well-drained loamy soil in sun or semi-shade[11, 200]. Plants have biennial stems, they produce a number of new stems from the perennial rootstock each year, these stems fruit in their second year and then die[200]. Often cultivated for its edible fruits in America, it is the parent of many named varieties. Plants in this genus are notably susceptible to honey fungus[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a running thicket former forming a colony from shoots away from the crown spreading indefinitely [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

4.2.77 *Berberis georgii*

Barberry

3 tin 7 cyuc 3 ckak 1 tcan 2 dwat 3 m hkuc
hmimhtut cyutli kyuctcup hwicli hyishrasljutnyikfrip hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

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

kcakta Edible Parts: Fruit Edible Uses: Fruit - raw or cooked[K]. A very acid lemon-like flavour, it is nice in small quantities raw. When cooked it can be used in pies, preserves etc[K]. A very good size for a barberry, the fruit is up to 10mm long and 4mm wide[K]. A refreshing lemon-like drink can be made from the fruit.

tcanta DyeA yellow dye is obtained from the roots, bark and stem.

dwatta Antibacterial Cancer DysenteryBerberine, universally present in rhizomes of *Berberis* species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with *Glycyrrhiza* species (Licorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta A hybrid of uncertain parentage. ksacta Not known in a truly wild condition.

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78]. Suckers, removed in late autumn/early winter and planted out in situ or potted up and planted out in late spring[200].

nwatta Prefers a warm moist loamy soil but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. Succeeds in full sun or light shade[11, 200]. Plants are hardy to about -35°C. This species is a hybrid of unknown origin, probably involving *B. vulgaris*[11]. It is an exceptionally free-fruited form[184] and is of interest in breeding programmes[K]. This species is probably an alternate host of black-stem rust of wheat. Hybridizes freely with other members of this genus[1]. Plants can be pruned back quite severely, they re-sprout well from the base[200].

4.2.78 *Tilia mongolica*

Mongolian Lime

3 tin 6 cyuc 3 ckak 0 tcan 1 dwat m hkuc
hmimhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Tilia mongolica* is a deciduous Tree growing to 15 m (49ft) by 12 m (39ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist

single trunk [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

4.2.57 *Vitis aestivalis*

Summer Grape, Long grape

3 tin 7 cyuc 3 ckak 0 tcan 1 dwat 20 m hkuc
hmimhtut cyutli kyuctcup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Vitis aestivalis* is a deciduous Climber growing to 20 m (65ft 7in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from June to July, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Fruit Leaves Sap Edible Uses: Fruit - raw, cooked in jellies, jams, pies etc or dried for later use[1, 2, 22, 46, 183]. Agreeably flavoured[11, 200]. The taste is best after a frost[101].The dried fruits are eaten as snacks or used in baked goods[183]. The fruit is about 8mm in diameter[200] and is produced in fairly large bunches[235]. Leaves - cooked[55, 159]. Young leaves are wrapped around other foods and then baked, they impart a pleasant flavour. A sweet watery sap is obtained from the stem[101, 183]. Used as a refreshing drink. Young tendrils - raw or cooked[55, 85, 159].

tcanta DyeA yellow dye is obtained from the fresh or dried leaves[168].

dwatta Diuretic Febrifuge Hepatic Poulitice Stomachic UrinaryThe leaves are hepatic[257]. They have been used in the treatment of the liver[257]. The wilted leaves have been applied as a poultice to the breasts to draw away soreness after the birth of a child[257]. A decoction of the leaves and stems has been taken in the treatment of stomach aches, fevers and headaches[257]. An infusion of the bark has been used to treat urinary complaints[257].

nrakta Southern and Eastern N. America - Ontario to Alabama. Locally naturalized in Europe[50]. ksacta Dry woods and thickets[43]. Stream bottom woods, usually on sandy soils, in Texas[274].

propta Seed - best sown in a cold frame as soon as it is ripe[K]. Six weeks cold stratification improves the germination rate, and so stored seed is best sown in a cold frame as soon as it is obtained. Germination should take place in the first spring, but sometimes takes another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant out in early summer. Cuttings of mature wood of the current seasons growth, December/January in a frame. These cuttings can be of wood 15 - 30cm long or they can be of short sections of the stem about 5cm long with just one bud at the top of the section. In this case a thin, narrow strip of the bark about 3cm long is removed from the bottom half of the side of the stem. This will encourage callusing and the formation of roots. Due to the size of these cuttings they need to be kept in a more protected environment than the longer cuttings. Layering.

nwatta Prefers a deep rich moist well-drained moderately fertile loam[1, 200]. Grows best in a calcareous soil[200]. Succeeds in sun or partial shade though a warm sunny position is required for the fruit to ripen[200]. Plants climb by means of tendrils[182]. They grow particularly well up elm trees[18]. The flowers are sweetly scented with the aroma of mignonette[245]. Any pruning should be carried out in winter when the plants are dormant otherwise they bleed profusely[182, 200]. This species is a parent of some cultivars that are grown for their edible fruits in N. America[1, 61]. Resistant to Phylloxera disease, a disease that almost destroyed the European grape crops[61]. This species can be used as a rootstock in areas where the disease is prevalent and can also be used in breeding programmes with *V. vinifera* in order to impart resistance to that species[183]. Plants in this genus are notably susceptible to honey fungus[200].

4.2.58 *Betula nigra*

River Birch, Black Birch, Red Birch, Water Birch, River Birch
3 tin 9 cyuc 3 ckak 0 tcan 2 dwat 20 m hkuc
hmimhtut cyutli tcup hwicli hrasljutnyikfrip hpa7tli flatprikliwis hpa7tmwatli hjonli

drutta *Betula nigra* is a deciduous Tree growing to 20 m (65ft 7in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in March, and the seeds ripen in June. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

kcakta Edible Parts: Sap Edible Uses: Sweetener Sap - raw or cooked[2]. A sweet flavour[177]. Harvested in early spring, before the leaves unfurl. The trunk is tapped by drilling a hole about 6mm wide and about 4cm deep. The sap flows best on warm sunny days following a hard frost. It makes a refreshing drink[55, 95] and can also be concentrated into a syrup or sugar[183]. The sap can be fermented to make birch beer or vinegar[183]. An old English recipe for the beer is as follows:- "To every Gallon of Birch-water put a quart of Honey, well stirr'd together; then boil it almost an hour with a few Cloves, and a little Limon-peel, keeping it well scum'd. When it is sufficiently boil'd, and become cold, add to it three or four Spoonfuls of good Ale to make it work...and when the Test begins to settle, bottle it up. . . it is gentle, and very harmless in operation within the body, and exceedingly sharpens the Appetite, being drunk ante pastum."[269].

tcanta Besom Soil stabilization WoodYoung branches are used to make besoms, whisks etc[6]. This species has an extensive root system and is sometimes planted for erosion control along the banks of streams[227]. Wood - light, strong, close grained and hard, but it contains many knots because of the numerous branches along the trunk. It weighs 36lb per cubic foot. Of little use commercially, though it is sometimes used for furniture, turnery etc[46, 61, 82, 227, 229].

dwatta Antiseborrhic Diuretic Dysentery Salve Stomachic UrinaryA salve was made by boiling the buds until they were thick and pasty, sulphur was added and this was then applied externally to skin sores and ringworm[213]. The leaves have been chewed, or used as an infusion, in the treatment of dysentery[257]. An infusion of the bark has been used to treat stomach problems, 'milky' urine and difficult urination with discharge[257]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve *Betula* species for infections of the urinary tract, kidney and bladder stones, rheumatism (see [302] for critics of commission E).

nrakta Eastern N. America - New Hampshire to Florida. ksacta Banks of streams, by swamps etc, in deep rich soil that is often inundated for weeks at a time[43].

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

nwatta Landscape Uses:Firewood, Pest tolerant, Specimen, Woodland garden. Succeeds in a well-drained loamy soil in a sheltered position[11, 43, 200]. Grows well in heavy clay soils. Likes its roots within reach of water[11]. Dislikes wet soils according to another report[200]. Shade tol-

erant[200]. Hybridizes freely with other members of this genus[50]. A good plant to grow near the compost heap, aiding the fermentation process[20]. Trees are notably susceptible to honey fungus[200]. Special Features: Attracts birds, North American native, Attracts butterflies, Inconspicuous flowers or blooms.

4.2.59 Abies balsamea

Balsam Fir
3 tin 6 cyuc 3 kcaok 0 tcan 5 dwat 15 m hkuc
pcimhimhtut cyutli tcup hwicli hrasljutnykfrp hpa7tli flat-
prkikwis hpa7tmwatli hjonli

drutta Abies balsamea is an evergreen Tree growing to 15 m (49ft) by 5 m (16ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 2 and is not frost tender. It is in leaf all year, in flower in May, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil. The plant is not wind tolerant.

pcista The oleoresin (Canada balsam) is reported to produce dermatitis when applied as perfume[222, 269]. The foliage has also induced contact dermatitis[269].

kcakta Edible Parts: Inner barkEdible Uses: Condiment Gum Tealinner bark - cooked. It is usually dried, ground into a powder and then used as a thickening in soups etc or mixed with cereals when making bread[105, 177]. Fir bark is a delight to chew in winter or early spring, slightly mucilaginous and sweetish, better raw than cooked[269]. Another report says that it is an emergency food and is only used when all else fails[183]. An aromatic resinous pitch is found in blisters in the bark[64]. When eaten raw it is delicious and chewy[101, 183]. Another report says that the balsam or pitch, in extreme emergency, forms a highly concentrated, though disagreeable, food[269]. An oleoresin from the pitch is used as a flavouring in sweets, baked goods, ice cream and drinks[183]. Tips of young shoots are used as a tea substitute[177, 183].

tcanta Adhesive Fibre Gum Kindling Microscope Repellent Resin Stuffing Waterproofing WoodThe balsamic resin 'Balm of Gilead'[11, 46] or 'Canada Balsam' according to other reports[64, 226, 238] is obtained during July and August from blisters in the bark or by cutting pockets in the wood[222]. Another report says that it is a turpentine[171]. The term Canada Balsam is a misnomer because balsams are supposed to contain benzoic and cinnamic acids, both absent from the Canada oleoresin[269]. Turpentine is also a misnomer, implying that the oleoresin is entirely steam volatile. Actually it contains 70 - 80% resin, only 16 - 20% volatile oil[269]. Canada Balsam yields 15 - 25% volatile oil, the resin being used for caulking and incense[269]. It is used medicinally and in dentistry, also in the manufacture of glues, candles and as a cement for microscopes and slides - it has a high refractive index resembling that of glass[11, 46, 64, 82, 222, 226, 238]. The pitch has also been used as a waterproofing material for the seams of canoes[257]. The average yield is about 8 - 10 oz per tree[171]. The resin is also a fixative in soaps and perfumery[171, 238]. "Turpentine" is usually collected during July-August by breaking the turpentine blisters into small metal cans with sharp-pointed lids. Trees are then allowed to recuperate for 1 - 2 years before being harvested again[269]. The leaves and young branches are used as a stuffing material for pillows etc - they impart a pleasant scent[46, 61, 257] and also repel moths[169]. The leaves contain an average of 0.65% essential oil, though it can go up to 1.4% or even higher[269]. One analysis of the essential oils reports 14.6% bornyl acetate, 36.1% b-pinene, 11.1% 3-carene, 11.1% limonene, 6.8% camphene, and 8.4% a-pinene[269]. To harvest the oil, it would appear that the branches should be snipped off younger trees in early spring[269]. Fifteen year old trees yield 70% more leaf oil than 110-year-old trees; oil yields are highest in January - March and September, they are lowest from April to August[269]. A thread can be made from the roots[257]. Wood - light, soft, coarse grained, not strong, not very durable. Weighs 24lb per cubic foot[235]. Used mainly for pulp, it

is not used much for lumber except in the manufacture of crates etc[46, 82, 226, 229]. The wood is commercially valuable for timber even though it is relatively soft, weak, and perishable[269]. Balsam fir is used in the US for timber and plywood, and is the mainstay of the pulp wood industry in the Northeast. The wood, which is rich in pitch, burns well and can be used as a kindling[257]

dwatta Analgesic Antisorbic Acid Antiseptic Diuretic Poul-tice Stimulant Tonic VDThe resin obtained from the balsam fir (see 'Uses notes' below) has been used throughout the world and is a very effective antiseptic and healing agent. It is used as a healing and analgesic protective covering for burns, bruises, wounds and sores[213, 222, 226]. It is also used to treat sore nipples[213] and is said to be one of the best curatives for a sore throat[245]. The buds, resin, and/or sap are used in folk remedies for treating cancers, corns, and warts[269]. The resin is also antisorbic, diaphoretic, diuretic, stimulant and tonic[4, 171, 222]. It is used internally in propriety mixtures to treat coughs and diarrhoea, though taken in excess it is purgative[238]. A warm liquid of the gummy sap was drunk as a treatment for gonorrhoea[212]. A tea made from the leaves is antisorbic[4, 171]. It is used in the treatment of coughs, colds and fevers[222]. The leaves and young shoots are best harvested in the spring and dried for later use[238]. This plant was widely used medicinally by various North American Indian tribes[257]. The resin was used as an antiseptic healing agent applied externally to wounds, sores, bites etc., it was used as an inhalant to treat headaches and was also taken internally to treat colds, sore throats and various other complaints[257].

nrakta North-eastern N. America - Newfoundland to Virginia, west to Alberta, Michigan and Ohio. ksacta Low swampy grounds where it is often the major component of forests[82]. Also found on well-drained hillsides[82].

propta Seed - sow early February in a greenhouse or outdoors in March[78]. Germination is often poor, usually taking about 6 - 8 weeks[78]. Stratification is said to produce a more even germination so it is probably best to sow the seed in a cold frame as soon as it is ripe in the autumn[80, 113]. Stored seeds should be moist stratified 14 - 28 days at 1 - 5°C, though fresh seed may be sown in autumn without stratification, with target seedling densities in the nursery ca 450 - 500/m², often mulched with sawdust. The seed remains viable for up to 5 years if it is well stored[113]. When large enough to handle, prick the seedlings out into individual pots and grow them on for at least their first winter in pots. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Of slow initial growth, the stock is usually outplanted as 2- to 3-year-old seedlings or 3- to 4-year-old transplants Alternatively, if you have sufficient seed, it is possible to sow in an outdoor seedbed. One report says that it is best to grow the seedlings on in the shade at a density of about 550 plants per square metre[78] whilst another report says that they are best grown on in a sunny position[80]. Trees often self-layer in the wild[226], so this might be a means of increasing named varieties in cultivation[K].

nwatta Landscape Uses:Christmas tree, Screen, Specimen. Prefers a good moist but not water-logged soil[1]. Grows well in heavy clay soils. Very shade tolerant, especially when young[81, 126], but growth is slower in dense shade[81]. Intolerant of atmospheric pollution[1]. Prefers slightly acid conditions down to a pH of about 5[200], though the cultivar 'Hudsonia' is more tolerant of alkaline conditions[238]. Prefers growing on a north-facing slope[200]. A shallow-rooted plant, making it vulnerable to high winds[229]. Balsam fir is estimated to tolerate an annual precipitation of 60 to 150cm, an annual temperature range of 5 to 12°C, and a pH of 4.5 to 7.5[269]. The balsam fir is a fast-growing tree in its native environment[229], but it is fairly short-lived and slow growing in Britain, becoming ungainly after about 20 years[11, 64, 81]. It grows best in the Perthshire valleys of Scotland[11, 185]. New growth takes place from late May to the end of July[185]. Trees are very cold hardy but are often excited into premature growth in mild winters and this new growth is susceptible to damage by late frosts[11]. Female strobili may be wholly or partially aborted up to 6 to 8 weeks after bud burst by late spring frosts[269]. Pollen dispersal can be reduced by adverse weather[269]. Trees should be planted into their permanent positions when they are quite small, between 30 and 90cm in height. Larger trees will check badly and hardly put

tibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Licorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218] and is also effective in the treatment of hypersensitive eyes, inflamed lids and conjunctivitis[244]. A tea made from the fruits is antipruritic, anti-septic, appetizer, astringent, diuretic, expectorant and laxative[7, 222]. It is also used as a febrifuge[213]. The fruit, or freshly pressed juice, is used in the treatment of liver and gall bladder problems, kidney stones, menstrual pains etc[9]. The leaves are astringent and antisorbic[7]. A tea made from the leaves is used in the treatment of coughs[222]. The plant (probably the inner bark) is used by homeopaths as a valuable remedy for kidney and liver insufficiency[244]. Other uses include malaria, and opium and morphine withdrawal[301].

nrakta Barberry Coast. Naturalized, or possibly native, in Britain[17]. ksacta Light deciduous woodland, hedges, roadsides, clearings etc, preferring a sunny position and a chalky soil[9, 268].

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Germination averages out at about 90%[98, 113]. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78]. Suckers, removed in late autumn/early winter and planted out in situ or potted up and planted out in late spring[3, 200].

nwatta Prefers a warm moist loamy soil but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Prefers a light rich rather dry soil according to another report[37]. Grows well in heavy clay soils. Succeeds in full sun or light shade[11, 200] but requires a moist soil when grown in the shade of trees[14]. Hardy to about -35°C[184]. A very ornamental plant[11], the barberry was at one time cultivated for its edible fruit, there are several named varieties[11, 200]. 'Dulcis' the fruit of which is sweet or slightly sour[200]. 'Asperma' is a seedless form that was often used in France to make a jam[182, 183]. An alternate host of 'black-stem rust' of wheat so it has been extensively grubbed up from its habitats[3, 11, 13, 74]. Hybridizes freely with other members of this genus[11], though it usually breeds fairly true to type[80]. Can be pruned back quite severely, it resprouts well from the base[200].

4.2.75 Rosa canina

Dog Rose
3 tin 7 cyuc 3 kcaok 4 tcan 3 dwat 3 m hkuc
hmiimhtut cyutli tcuphja7n hwicli hrasljutnykfrp hpa7tli flat-
prkikwis hpa7tmwatli fyifxre7t hjonli

drutta Rosa canina is a deciduous Shrub growing to 3 m (9ft) by 3 m (9ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from June to July, and the seeds ripen from October to December. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles, Lepidoptera (Moths and Butterflies), Apomictic (reproduce by seeds formed without sexual fusion). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil. The plant can tolerate strong winds but not maritime exposure.

pcista There is a layer of hairs around the seeds just beneath the flesh of the fruit. These hairs can cause irritation to the mouth and digestive tract if ingested.

kcakta Edible Parts: Flowers Fruit SeedEdible Uses: Coffee TeaFruit - raw or cooked[2, 4, 13]. It can be used in making delicious jams, syrups etc[7]. The syrup is used as a nutritional supplement, especially for babies[238]. The fruit can also be dried and used as a tea[9, 12, 183]. Frost softens and sweetens the flesh[12]. The fruit is up to 30mm in diameter[200], but there is only a thin layer of flesh surrounding the many seeds[K]. Some care has to be taken when eating this fruit, see the notes above on known hazards. The seed is a good source of vitamin E[102], it can be ground and mixed with flour or added to other foods as a supplement. Be sure to remove the seed hairs[102]. The dried leaves are used as a tea substitute[46, 61, 183]. A coffee substitute according to another report[7]. Petals - raw or cooked[177]. The base of the petal may be bitter so is best removed[183]. Eaten as a vegetable in China[66]. The petals are also used to make an unusual scented jam[7].

tcanta Hedge HedgePlants make a dense and stock-proof hedge, especially when trimmed[186].

dwatta Antirheumatic Astringent Bach Cancer Carmi-native Diuretic Laxative Ophthalmic Tonic Vermifuge Vitamin CThe petals, hips and galls are astringent, carminative, diuretic, laxative, ophthalmic and tonic[7, 9, 14, 21, 165]. The hips are taken internally in the treatment of colds, influenza, minor infectious diseases, scurvy, diarrhoea and gastritis[238]. A syrup made from the hips is used as a pleasant flavouring in medicines and is added to cough mixtures[238]. A distilled water made from the plant is slightly astringent and is used as a lotion for delicate skins[7]. The seeds have been used as a vermifuge[7]. The plant is used in Bach flower remedies - the keywords for prescribing it are 'Resignation' and 'Apathy'[209]. The fruit of many members of this genus is a very rich source of vitamins and minerals, especially in vitamins A, C and E, flavanoids and other bio-active compounds. It is also a fairly good source of essential fatty acids, which is fairly unusual for a fruit. It is being investigated as a food that is capable of reducing the incidence of cancer and also as a means of halting or reversing the growth of cancers[214]. Ascorbic acid in Dog Rose shells (vitamin C, 0.2 to 2.4%).

nrakta Europe, including Britain, from Norway south and east to N. Africa and southwest Asia. ksacta Hedges, scrub, woods, roadsides, banks etc[9].

propta Seed. Rose seed often takes two years to germinate. This is because it may need a warm spell of weather after a cold spell in order to mature the embryo and reduce the seedcoat[80]. One possible way to reduce this time is to scarify the seed and then place it for 2 - 3 weeks in damp peat at a temperature of 27 - 32°C (by which time the seed should have imbibed). It is then kept at 3°C for the next 4 months by which time it should be starting to germinate[80]. Alternatively, it is possible that seed harvested 'green' (when it is fully developed but before it has dried on the plant) and sown immediately will germinate in the late winter. This method has not as yet(1988) been fully tested[80]. Seed sown as soon as it is ripe in a cold frame sometimes germinates in spring though it may take 18 months. Stored seed can be sown as early in the year as possible and stratified for 6 weeks at 5°C[200]. It may take 2 years to germinate[200]. Prick out the seedlings into individual pots when they are large enough to handle. Plant out in the summer if the plants are more than 25cm tall, otherwise grow on in a cold frame for the winter and plant out in late spring. Cuttings of half-ripe wood with a heel, July in a shaded frame. Overwinter the plants in the frame and plant out in late spring[78]. High percentage[78]. Cuttings of mature wood of the current seasons growth. Select pencil thick shoots in early autumn that are about 20 - 25cm long and plant them in a sheltered position outdoors or in a cold frame[78, 200]. The cuttings can take 12 months to establish but a high percentage of them normally succeed[78]. Division of suckers in the dormant season. Plant them out direct into their permanent positions. Layering. Takes 12 months[11].

nwatta Succeeds in most soils[11, 200]. Grows well in heavy clay soils. Prefers a circumneutral soil and a sunny position with its roots in the shade[11, 200]. When grown in deep shade it usually fails to flower and fruit[186]. Succeeds in wet soils but dislikes water-logged soils or very dry sites[186]. Tolerates maritime exposure[186]. The fruit attracts many species of birds, several gall wasps and other insects use the plant as a host[186]. A very polymorphic species, it is divided into a great number of closely related species

over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

4.2.73 Aronia melanocarpa

Black Chokeberry, Black Berried Aronia
3 tlin 8 cyuc 3 ckak 2 tcan 1 dwat m hkc
hmmihtut cyutli kyuctup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Aronia melanocarpa is a deciduous Shrub growing to 2.5 m (8ft) by 3 m (9ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from July to August, and the seeds ripen from October to December. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

ckakta Edible Parts: FruitEdible Uses: Pectin Pectin-Fruit - cooked. A good flavour but very astringent[183]. The fruit should be fully ripe before being eaten and is best after a frost or two[K]. It makes a good jelly when sugar is added and is also dried and used for making pemmican[183]. The fruit is rich in pectin and can be added to fruits that are low in this substance when making jams etc[183]. Pectin is also said to protect the body against radiation[201]. The fruit is about 9mm in diameter[200].

tcanta Miscellany Pectin PectinThe fruit is a source of pectin[183], a substance that is used to thicken jams etc and as a culture medium in laboratories.

dwatta MiscellanyAn infusion of the berries has been used in the treatment of coughs[257].

nrakta Eastern N. America - Nova Scotia to Ontario, south to Florida and Michigan. ksacta Swamps and low woodlands, it is sometimes also found in drier soils[200, 235].

propta Seed - best sown as soon as it is ripe in pots outdoors or in a cold frame[113]. Pre-soak stored seed overnight and then cold stratify for 3 months at 2°C[113]. The seed germinates in 1 - 3 months at 15°C[134]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter. Plant out in late spring. Cuttings of half-ripe wood, July/August in a frame[113]. Division of suckers in the dormant season[200]. Very easy, they can be planted straight out into their permanent positions. Layering[200].

nwatta Landscape Uses:Screen, Specimen. Prefers a moist peaty soil in full sun or partial shade[200]. Succeeds in most soils but dislikes shallow chalk[200]. More tolerant of dry soils than other members of this genus[200]. Plants are hardy to about -25°C. There is at least one cultivar developed for its improved fruit. 'Nero' has fruits twice the size of the species with a vitamin C content of 15 - 30 mg (per 100g?). The fruit is borne in clusters of about 15, it is more flavourful and the yield is about twice that of wild forms[183]. Other cultivars developed mainly for their ornamental value include 'Viking' with extra large berries and 'Aron' with numerous large berries[182]. The sub-species *A. melanocarpa elata* Rehd. and *A. melanocarpa grandifolia* (Lindl.)Schneid. are more vigorous than the type species with larger flowers and fruits[200]. This genus is closely related to *Sorbus* species[200]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: Attracts birds, North American native, Naturalizing, Wetlands plant, Attractive flowers or blooms. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from

1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A clumping plant, forming a colony from shoots away from the crown but with a limited spread [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

4.2.74 Berberis vulgaris

European Barberry, Common barberry
3 tlin 7 cyuc 3 ckak 4 tcan 3 dwat 3 m hkc
hmmihtut cyutli kyuctup hwicli hyishrasjlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli fyfxre7t hjonli

drutta Berberis vulgaris is a deciduous Shrub growing to 3 m (9ft) by 2 m (6ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in leaf from March to November, in flower from May to June, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Bark in doses of 4 mg or more; stupor, nose-bleeds, vomiting, diarrhoea and kidney irritation. Contraindicated during pregnancy as abortion risk[301].

ckakta Edible Parts: Fruit LeavesEdible Uses: Condiment TeaFruit - raw or cooked[2, 3, 5, 7, 9, 11, 95, 183]. Rich in vitamin C[268], the fruit has a very acid flavour and is mainly used in preserves[100], though children and some adults seem to like it raw when it is fully ripe[K]. A refreshing lemon-like drink can be made from the fruit[183]. The fruits are about 10mm long[200]. Young leaves - used as a flavouring or as an acid nibble[177, 183]. They can be used in much the same way as sorrel (*Rumex acetosa*)[9]. The dried young leaves and shoot tips make a refreshing tea[9, 183].

tcanta Beads Dye Fuel Hedge Hedge WoodPlants can be grown as a medium-size hedge in exposed positions but they cannot tolerate extreme maritime exposure[75]. They are very tolerant of trimming but can also be left untrimmed if required[K]. A good quality yellow dye is obtained from the roots, bark and stem[4, 13, 46, 100, 244]. As well as being used on cloth, it is also used to stain wood[244]. The unripe fruit is dried and used as beads[106]. Wood - soft, very hard, fine grained, yellow. Used for carving, toothpicks, mosaics etc[13, 46, 61]. It is also used as a fuel[146].

dwatta Antibacterial Antidiarrhoeal Antipruritic Antirheumatic Antiseptic Antispasmodic Appetizer Astringent Cancer Chologogue Diaphoretic Diuretic Dysentery Expectorant Hepatic Homeopathy Laxative Malaria Ophthalmic Purgative Refrigerant Stomachic TB Tonic Vitamin CBarberies have long been used as a herbal remedy for the treatment of a variety of complaints. All parts of the plant can be used though the yellow root bark is the most concentrated source of active ingredients. The plant is mainly used nowadays as a tonic to the gallbladder to improve the flow of bile and ameliorate conditions such as gallbladder pain, gallstones and jaundice[254]. The bark and root bark are antiseptic, astringent, cholagogue, hepatic, purgative, refrigerant, stomachic and tonic[4, 7, 9, 21, 46, 165, 222]. The bark is harvested in the summer and can be dried for storing[4]. It is especially useful in cases of jaundice, general debility and biliousness[4], but should be used with caution[165]. The flowers and the stem bark are antirheumatic[218]. The roots are astringent and antiseptic[222]. They have been pulverized in a little water and used to treat mouth ulcers[213]. A tea of the roots and stems has been used to treat stomach ulcers[213]. The root bark has also been used as a purgative and treatment for diarrhoea[213] and is diaphoretic[222]. A tincture of the root bark has been used in the treatment of rheumatism, sciatica etc[222]. The root bark is a rich source of the alkaloid berberine - about 6%[240]. Berberine, universally present in rhizomes of *Berberis* species, has marked an-

on any growth for several years. This also badly affects root development and wind resistance[200]. Trees have a thin bark and are therefore susceptible to forest fires[229]. This species is closely related to *A. fraseri*[11]. Plants are strongly outbreeding, self-fertilized seed usually grows poorly[200]. They hybridize freely with other members of this genus[200]. The cones break up on the tree and if seed is required it should be harvested before the cones break up in early autumn[80]. Whilst the typical species is too large for most gardens, there are some named slow-growing dwarf forms that can be grown[238]. Whilst these will not provide the resin, their leaves can be used medicinally[K]. The leaves are strongly aromatic of balsam when crushed[185]. The tree is sometimes grown and used as a 'Christmas tree'[226]. Special Features: North American native, There are no flowers or blooms.

4.2.60 Quercus x bebbiana

3 tlin 7 cyuc 3 ckak 0 tcan 2 dwat 15 m hkc
hmmihtut cyutli hgatyuctup hwicli jlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli hjonli

drutta Quercus x bebbiana is a deciduous Tree growing to 15 m (49ft) by 8 m (26ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower in May, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

ckakta Edible Parts: SeedEdible Uses: CoffeeSeed - raw or cooked[183]. The large seeds are sweet and can be eaten out of hand[183]. The seed can be ground into a powder and used in making bread, dumplings etc and as a thickener in soups[183]. If the seed is bitter then this is due to the presence of tannins, these can be leached out by thoroughly washing the dried and ground up seed in water, though many minerals will also be lost. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute.

tcanta Repellent Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[200]. Oak galls are excrecences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. Wood - hard, heavy, strong, tough, very durable, close grained.

dwatta Astringent DysenteryAny galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta A hybrid of garden origin. ksacta Not known in the wild.

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly. This species is a hybrid and may not breed true from seed[K].

nwatta Prefers a good deep fertile loam which can be on the stiff side[11]. Lime tolerant[188]. Succeeds in a hot dry position. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. A vigorous, fast-growing hybrid species, some forms are capable of reaching 1.5 metres tall in 2 years[183]. Established plants are drought resistant[229] and tolerant of atmospheric pollution[226]. This

species is occasionally cultivated for its edible seed, there are some named varieties[183]. It is a hybrid of garden origin. *Q. alba* x *Q. macrocarpa*[183]. Both of its parents prefer warmer summers than are usually experienced in Britain, often growing poorly in this country and failing to properly ripen their wood, resulting in frost damage overwinter[11, 200]. The tree flowers on new growth produced in spring, the seed ripening in its first year[200, 229]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200].

4.2.61 Malus tschonoskii

Pillar apple, Crabapple
3 tlin 8 cyuc 3 ckak 0 tcan 0 dwat 12 m hkc
hmmihtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Malus tschonoskii is a deciduous Tree growing to 12 m (39ft) by 7 m (23ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

ckakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177]. A gritty texture[1]. A reasonable size, about 2 - 3cm in diameter[200], but the fruit is not freely produced[11, 200]. A tree at Kew is fruiting well, producing fruits about 30mm in diameter and these fruits can hang on the tree all winter[K]. Even when harvested in February the fruits were quite firm, slightly juicy with a strong acid flavour rather like a lemon[K].

nrakta E. Asia - Japan. ksacta Woods in C. Japan[58, 109].

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

nwatta Landscape Uses:Border, Specimen, Street tree. An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[1, 200]. This tree is well suited to planting in public-access areas[200]. The fruit is a good wildlife food source, especially for birds[200]. Hybridizes freely with other members of this genus[200]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features:Not North American native, Fragrant flowers, Attractive flowers or blooms.

4.2.62 Betula alleghaniensis

Yellow Birch, Swamp Birch
3 tlin 7 cyuc 3 ckak 4 tcan 2 dwat 12 m hkc

hmmihtut cyutli tcup hwicli hrasljutnyikfrp hpa7tli flatprikliwis hpa7tmwatli hjonli

drutta Betula alleghaniensis is a deciduous Tree growing to 12 m (39ft) by 3 m (9ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in April, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

ksakta Edible Parts: Inner bark SapEdible Uses: Condition Sweetener TeaInner bark - cooked or dried and ground into a powder and used with cereals in making bread[62]. Inner bark is generally only seen as a famine food, used when other forms of starch are not available or are in short supply[K]. Sap - raw or cooked. A sweet flavour[62, 102, 161, 177]. The sap is harvested in early spring, before the leaves unfurl, by tapping the trunk. It flows abundantly, but the sugar content is much lower than maple sap[226]. A pleasant drink, it can also be concentrated into a syrup or fermented into a beer[183, 226]. An old English recipe for the beer is as follows: "To every Gallon of Birch-water put a quart of Honey, well stirr'd together; then boil it almost an hour with a few Cloves, and a little Limon-peel, keeping it well scum'm'd. When it is sufficiently boil'd, and become cold, add to it three or four Spoonfuls of good Ale to make it work...and when the Test begins to settle, bottle it up . . . it is gentle, and very harmless in operation within the body, and exceedingly sharpens the Appetite, being drunk ante pastum."[269]. A tea is made from the twigs and leaves[62, 177]. The dried leaves are used according to another report[183]. An excellent flavour[226]. The twigs and leaves have the flavour of wintergreen and can be used as condiments[183].

tcanta Containers Fuel Waterproofing WoodThe bark is waterproof and has been used by native peoples as the outer skin of canoes, as roofing material on dwellings and to make containers such as buckets, baskets and dishes[257]. Wood - close-grained, very strong, hard, heavy. The wood is too dense to float[226]. An important source of hardwood lumber, it is used for furniture, boxes, tubs of wheels, floors etc[46, 61, 82, 171, 229]. It is also often used as a fuel[46, 61]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Antiseborrheic Cathartic EmeticYellow birch is little used medicinally, though a decoction of the bark has been used by the native North American Indians as a blood purifier, acting to cleanse the body by its emetic and cathartic properties[257]. The bark is a source of 'Oil of Wintergreen'[226]. This does have medicinal properties, though it is mainly used as a flavouring in medicines[226].

nrakta North-eastern N. America - Newfoundland to Virginia and Tennessee. ksakta Usually found in moist well-drained soils in rich woodlands on lower slopes, it is also found in cool marshlands in the south of its range[62, 229].

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

nwatta Landscape Uses:Specimen, Woodland garden. Succeeds in a well-drained loamy soil in a sheltered position[11, 200]. Grows well in heavy clay soils. Dislikes wet soils[200]. Shade tolerant[200]. A slow-growing tree, it is relatively long-lived for a birch, with specimens 200 years old recorded[229]. Plants often grow taller than the 12 metres mentioned above[229]. The trees are highly susceptible to forest fires, even when wet the bark is highly in-

flammable[226]. The bruised foliage has a strong smell of wintergreen[200]. Hybridizes freely with other members of this genus[50]. Trees are notably susceptible to honey fungus[200]. Special Features: Attracts birds, North American native, Inconspicuous flowers or blooms. The plant is heat tolerant in zones 7 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2]. The root pattern is a heart root, dividing from the crown into several primary roots going down and out [1-2].

4.2.63 Prunus americana lanata

3 tlin 7 cyuc 3 kcaak 2 tcan 1 dwat 10 m hkuc
hmmihtut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Prunus americana lanata is a deciduous Tree growing to 10 m (32ft 10in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in April, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

ksakta Edible Parts: Fruit SeedEdible Uses: Fruit - raw or cooked[159]. Used mainly in jellies[177]. The fruit is about 25mm in diameter, it has a thick succulent flesh and contains one large seed[82, 200]. Seed - raw or cooked. Do not eat the seed if it is too bitter - see the notes above on toxicity.

tcanta Dye WoodA green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168]. Wood - heavy, hard, close-grained, strong[82]. The tree is too small for the wood to be of commercial value[229].

dwatta Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta Central and Southern N. America - Indiana to Illinois, south to Texas. ksakta Hillsides and river bottom lands[82].

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200].

ness. It is hardy to UK zone 3 and is not frost tender. It is in flower in April. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

ksakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. The fruit can be up to 6cm in diameter[200]. Very astringent and quite harsh[K].

tcanta RootstockCan be used as a dwarfing rootstock for the cultivated apples.

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

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[1, 200]. The fruit is a good wildlife food source, especially for birds[200]. Plants have been seen at Kew Gardens bearing huge crops of fruit[K]. Hybridizes freely with other members of this genus[200]. Plants in this genus are notably susceptible to honey fungus[200].

4.2.72 Quercus macrocarpa

Burr Oak, Mossy Cup Oak

3 tlin 8 cyuc 3 kcaak 4 tcan 2 dwat m hkuc
hmmihtut cyutli hgatkyucup hwicli jlutnyikfrp hpa7tli flatprikliwis hpa7tmwatli hjonli

drutta Quercus macrocarpa is a deciduous Tree growing to 15 m (49ft) by 8 m (26ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower in May, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

ksakta Edible Parts: SeedEdible Uses: Seed - cooked[101, 105, 161, 257]. Very large, the seed can be up to 5cm x 4cm[82, 200], though it is somewhat variable in size and shape[227]. The seed can be ground into a powder and used in making bread, dumplings etc and as a thickener in soups[183]. The seed of this species is considered to be one of the most palatable of all the oaks[159, 183]. Many trees have sweet seeds with little tannin and the seed can be eaten raw or cooked. If the seed is bitter then this is due to the presence of tannins, these can be leached out by thoroughly washing the dried and ground up seed in water, though many minerals will also be lost. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would

have lost most of its astringency. The roasted seed is a coffee substitute.

tcanta Mordant Repellent Tannin WoodAgroforestry Uses: The tree has been widely tested for use in rehabilitation of the soil. It has been successfully planted on coal spoils in the north-central and northern Great Plains, and in the Western Interior Coal Province which encompasses Missouri, Kansas, and Oklahoma. It may be either seeded or transplanted onto disturbed areas[1050]. Other Uses: The leaves of most species in this genus are more or less rich in tannins. A mulch of the leaves can be placed around vulnerable plants in order to repel slugs, snails, grubs etc. Fresh leaves should be used with caution, since these can utilize some of the nitrogen in the soil and thus inhibit plant growth[20, K]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. The bark has been used as a mordant for fixing dyes[257]. The wood is hard, heavy, strong, tough, very durable, close grained. It weighs about 46lb per cubic metre[227]. This species is of considerable importance as a timber tree, it is used for all types of construction, in making baskets, flooring, cabinet making, ship building, cooperage, fence posts etc[46, 61, 82, 149, 171, 227, 229, 338]. The wood is a good fuel[82].

dwatta Antispasmodic Astringent Dysentery TonicThe bark is astringent and tonic[61]. An infusion has been used in the treatment of diarrhoea[257]. A decoction of the root or inner bark has been used in the treatment of cramps[257]. Any galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta Eastern N. America - Nova Scotia to Manitoba, Wyoming, Massachusetts, Georgia, Kansas and Texas. ksakta Found in a variety of habitats from dry hillsides to moist bottomlands, rich woods and fertile slopes, mainly on limestone soils[43, 229].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Landscape Uses:Firewood, Pest tolerant, Aggressive surface roots possible. Specimen. Prefers a good deep fertile loam which can be on the stiff side[11]. Lime tolerant[188]. Succeeds in a hot dry position. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. A slow-growing tree[188]. Established plants are drought resistant[229] and tolerant of atmospheric pollution[226]. Trees have a thick, fire-resistant bark[274]. Occasionally cultivated for its edible seed, there are some named varieties[183]. Slow growing in the wild, it takes about 30 years to start producing seed, though it then continues to crop for the next 200 - 300 years with large crops being produced every 2 - 3 years[229]. The tree flowers on new growth produced in spring, the seed ripening in its first year[200, 229]. Prefers warmer summers than are usually experienced in Britain, often growing poorly in this country and failing to properly ripen its wood, resulting in frost damage overwinter[11, 200]. A tree at the Hillier Arboretum in Hampshire was growing well in September 1993. It was 9 metres tall but had a lot of mildew, there was no sign of seeds[K]. There is a dwarf form of this species:- Q. macrocarpa depressa (Nutt.)Engelm. grows about 2 metres tall with corky branches and smaller seeds than the species, usually about 1cm long[227]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200]. Special Features:North American native, Inconspicuous flowers or blooms. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to

drutta *Malus pumila paradisiaca* is a deciduous Tree growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower in April. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 50]. The fruit can be up to 6cm in diameter[200].

tcanta RootstockCommonly used as a dwarfing rootstock for the cultivated apple, there are several named varieties[200].

nrakta Europe. ksacta Not known in the wild[50].

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

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[1, 200]. Commonly cultivated as a rootstock for the cultivated apple, there are several named varieties[200]. The fruit is a good wildlife food source, especially for birds[200]. Hybridizes freely with other members of this genus[200]. Plants in this genus are notably susceptible to honey fungus[200].

4.2.70 Viburnum opulus

Guelder Rose, Cramp Bark, European cranberrybush, American cranberrybush, Crampbark, European Highb 3 tin 8 cyuc 3 kcaak 3 tcan 3 dwat 5 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatprklwisslip hpa7tmwatli fyfixre7t hjonli

drutta *Viburnum opulus* is a deciduous Shrub growing to 5 m (16ft) by 5 m (16ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from June to July, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

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

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 3, 5, 46]. The fruit is up to 8.5mm in diameter but with a large seed[200]. A sour taste, it is best cooked. The crushed fruit has an unpleasant smell[4]. Used as a cranberry substitute in making jellies, preserves etc[183]. Some caution is advised, see notes on toxicity at top of the page.

tcanta Dye Hedge Hedge Ink WoodA red dye is obtained from the fruit[13]. An ink can be made from the dried berries[4]. Plants can be grown as a tall hedge[29], they are rather bare in winter though[K]. The wood can be used to make skewers[4].

dwatta Antispasmodic Astringent Birthing aid Homeopathy SedativeGuelder rose is a powerful antispasmodic and is much used in the treatment of asthma, cramps and other conditions such as colic or painful menstruation[254]. It is also used as a sedative remedy for nervous conditions[254]. The bark is antispasmodic, astringent and sedative[4, 9, 46, 165, 213]. The bark contains 'scopeletin', a coumarin that has a sedative effect on the uterus[238]. A tea is used internally to relieve all types of spasms, including menstrual cramps, spasms after childbirth and threatened miscarriage[9, 222, 238]. It is also used in the treatment of nervous complaints and debility[4, 46, 165, 213]. The bark is harvested in the autumn before the leaves change colour, or in the spring before the leaf buds open. It is dried for later use[238]. The leaves and fruits are antiscorbatic, emetic and laxative[4, 222]. A homeopathic remedy is made from the fresh bark[9]. It is used in the treatment of menstrual pain and spasms after childbirth[9].

nrakta Europe, including Britain, from Scandinavia south and east to Spain, north and west Asia. ksacta Hedges, scrub and woodland, usually on damp soils[3, 13, 17].

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

nwatta Landscape Uses:Border, Massing, Screen, Specimen. An easily grown plant, it succeeds in most soils but is ill-adapted for poor soils and for dry situations[1]. It prefers a deep rich moist loamy soil in a sunny position[11]. Succeeds in semi-shade but does not grow or fruit so well in such a position[186]. Grows well in heavy clay soils and on chalk[184]. Does not do well on very acid soils. Best if given shade from the early morning sun in spring[200]. A very ornamental plant[1], it is hardy to about -30°c[184] and is often grown in the flower garden. There are many named varieties[184]. Guelder rose regenerates quickly if it is cut to the ground, it can also produce suckers and will often form thickets[186]. The plant is an alternative host for the broad bean aphid[11]. Special Features: Not North American native, Naturalizing, Attractive flowers or blooms. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fleshy. Thick or swollen - fibrous or tap root [2-1].

4.2.71 Malus pumila nervosa

Crab Apple

3 tin 7 cyuc 3 kcaak 2 tcan 0 dwat 5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprklwis hpa7tmwatli xre7t hjonli

drutta *Malus pumila nervosa* is a deciduous Tree growing to 5 m (16ft) by 8 m (26ft). See above for USDA hardi-

Softwood cuttings from strongly growing plants in spring to early summer in a frame[200]. Layering in spring.

nwatta Thrives in a well-drained moisture-retentive loamy soil, doing well on limestone[11, 200]. Prefers some lime in the soil but is likely to become chlorotic if too much lime is present[1]. Succeeds in sun or partial shade though it fruits better in a sunny position[11, 200]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. Plants in this genus are notably susceptible to honey fungus[200].

4.2.64 Juniperus scopulorum

Rocky Mountain Juniper, Weeping Rocky Mountain Juniper, Colorado Red Cedar

3 tin 7 cyuc 3 kcaak 4 tcan 2 dwat 10 m hkuc htut cyutli hगत्युत्cup hwicli hrasjlutnyik hpa7tli flatprklwisslip hpa7tmwatli nyanhjen hjonli

drutta *Juniperus scopulorum* is an evergreen Tree growing to 10 m (32ft) by 4 m (13ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in leaf all year, in flower from April to May, and the seeds ripen in October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure.

kcakta Edible Parts: FruitEdible Uses: Coffee Condiment TeaFruit - raw or cooked[105, 161, 183]. Sweet and fleshy, but strongly flavoured[85, 229]. Resinous[227]. Often used as a flavouring, imparting a sage-like taste, for which purpose it is usually dried and ground into a powder[85, 183]. The fruit can also be dried and ground into a meal for making mush and cakes[183]. The fruits are about 5 - 6mm in diameter[200, 227]. The roasted fruit is a coffee substitute[183]. A tea is made from the fruits and young shoots[183].

tcanta Beads Disinfectant Incense Parasiticide Repellent Shelterbelt Tinder Wax WoodA fragrant wax on the fruits can be obtained by boiling the fruit and skimming off the wax as it floats to the surface. It is used to make aromatic candles but is only present in small quantities[85]. The boughs are used as an incense to fumigate houses and to drive off smells. The wood can be burnt or just hung in the room, or it can be boiled up in water and the water used to wash the walls, floor etc[99]. The bark is employed as a tinder and is also made into a slow match[216]. The dried seeds have been used as beads or as the 'rattle' in rattles[99, 216]. The fruits and the leaves are used as an insect repellent[169]. A strong infusion of the cones is used to kill ticks[99]. Plants can be grown as a ground cover, the cultivar 'Repens' is especially suitable[208]. A fairly wind resistant tree, it can be grown as part of a shelterbelt planting[200]. In N. America it is used to some extent in re-afforestation and shelterbelt plantings on the prairies[227]. Wood - extremely tough, aromatic, close grained, light, fairly strong in endwise compression but moderately weak in bending, hard, durable in the soil. Used for interior finishes, bows, hoops, hafts, wheels etc[99, 149, 227].

dwatta Antidandruff Appetizer Diaphoretic Disinfectant Diuretic Haemostatic Kidney Laxative Parasiticide Poultrice Sedative Stomachic Tonic VDRocky Mountain juniper was widely employed medically by many native North American Indian tribes who used it in particular to treat problems connected with the chest and kidneys[257]. It is little, if at all, used in modern herbalism. A tea made from the terminal shoots has been used in the treatment of VD by some N. American Indian tribes[213]. The treatment has to be taken over a long period of time[257]. The fruits are appetizer, diuretic and stomachic[257]. An infusion has been used in the treatment of stomach, kidney and bladder problems[213, 257]. An infusion of the twigs has been used in the treatment of fevers, pneumonia, coughs and colds[257]. A poultice of the mashed and dampened branches has been applied to skin sores[257]. The leaves are diaphoretic, disinfectant, febrifuge, haemostatic, laxative, sedative and tonic[99, 216, 257]. A decoction has been used in the treatment of

internal bleeding, constipation and constant coughing[257]. The leaves have been boiled, then mixed with turpentine and used as an external treatment on rheumatic joints[257]. The leaves have been rubbed into the hair in order to treat dandruff[213, 257].

nrakta Western N. America - British Columbia to Mexico and California. ksacta Scattered singly on dry rocky ridges, foothills and bluffs[82, 85] in montane areas or in dry habitats of the coastal forest region[226]. The best specimens are found on slightly alkaline soils[229].

propta The seed requires a period of cold stratification. The seed has a hard seedcoat and can be very slow to germinate, requiring a cold period followed by a warm period and then another cold spell, each of 2 - 3 months duration[78, 81]. Soaking the seed for 3 - 6 seconds in boiling water may speed up the germination process[11]. The seed is best sown as soon as it is ripe in a cold frame. Some might germinate in the following spring, though most will take another year. Another possibility is to harvest the seed 'green' (when the embryo has fully formed but before the seedcoat has hardened). The seedlings can be potted up into individual pots when they are large enough to handle. Grow on in pots until large enough, then plant out in early summer. When stored dry, the seed can remain viable for several years[1]. Cuttings of mature wood, 5 - 10cm with a heel, September/October in a cold frame. Plant out in the following autumn[1, 78]. Layering in September/October. Takes 12 months[78].

nwatta Landscape Uses:Alpine garden, Border, Screen, Specimen, Street tree. Succeeds in most soils, including chalk[200], so long as they are well drained, preferring a neutral or slightly alkaline soil[1, 11]. A drought tolerant species once established, succeeding in hot dry positions[200]. Plants are fairly wind-resistant[200]. A long-lived but slow-growing tree in its native range[227], it is very slow growing in Britain where it only makes a shrub[185]. Closely allied to *J. virginiana*[1, 81] and hybridising with it where the ranges meet[226]. It differs mainly in the fruit, which takes two years to mature in this species instead of one[226]. Plants are resistant to honey fungus[88]. This tree is apparently resistant to the rust fungus that attacks the closely related *J. virginiana*[149]. Dioecious. Male and female plants must be grown if seed is required. Special Features:North American native, Fragrant foliage, Inconspicuous flowers or blooms. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is flat with shallow roots spreading near the soil surface [2-1].

4.2.65 Prunus cerasus austera

Morello Cherry

3 tin 7 cyuc 3 kcaak 0 tcan 1 dwat 9 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatprklwis hpa7tmwatli fyfixre7t hjonli

drutta *Prunus cerasus austera* is a deciduous Tree growing to 9 m (29ft 6in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in May, and the seeds ripen in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: Fruit Oil Oil SeedEdible Uses: Gum Gum Oil Oil TeaFruit - raw or cooked[1, 2, 5, 11, 12]. The fruit is neither bitter nor sweet, but is pleasantly acid[11] and it

can be eaten out of hand, used in pies, preserves etc or dried for later use[183]. The fruit has a dark juice[11]. The fruit is about 18mm in diameter and contains one large seed[200]. Seed - raw or cooked. Do not eat the seed if it is too bitter - see the notes above on toxicity. An edible oil is obtained from the seed[46, 61]. When refined it is used as a salad oil[183]. The leaves are used as a tea substitute[46, 61, 183]. A gum obtained from the trunk is used for chewing[61, 64].

tcanta Adhesive Dye Gum Gum Hedge Hedge Oil Oil WoodAn edible drying oil obtained from the seed is also used in cosmetics[61]. The gum obtained from the stem is also used as an adhesive[61, 64]. Plants can be grown as a hedge[50], succeeding in fairly exposed positions[K]. A green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168].

dwatta Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta S.E. Europe to W. Asia. ksacta Not known in the wild[11].

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[113]. Soft-wood cuttings from strongly growing plants in spring to early summer in a frame. Layering in spring. Division of suckers during the dormant season. They can be planted out direct into their permanent positions.

nwatta Thrives in a well-drained moisture-retentive loamy soil[11, 200]. Prefers some lime in the soil but is likely to become chlorotic if too much lime is present[1]. Prefers an acid soil according to another report[5]. Succeeds in sun or partial shade though it fruits better in a sunny position[11, 200]. Plants succeed when grown against a north-facing wall, the fruit ripens later in this position thus extending the season[11, K]. Hardy to about -20°C[184]. This subspecies covers the cultivated bitter cherries known as Morello cherries[11]. They have been long cultivated for their edible fruit and there are several named varieties[200]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. Plants produce suckers freely[184]. Plants in this genus are notably susceptible to honey fungus[200].

4.2.66 Prunus cerasus caproniana

Kentish Red Cherry

3 tlin 7 cyuc 3 kcaak 0 tcan 1 dwat 9 m hkuc hmimhtut cyutli tcup hwicli hrasjltunyk hpa7tli frusflatprik-wis hpa7tmwatli fyifxre7t hjonli

drutta Prunus cerasus caproniana is a deciduous Tree growing to 9 m (29ft 6in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in May, and the seeds ripen in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In

excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: Fruit Oil Oil SeedEdible Uses: Gum Gum Oil Oil TeaFruit - raw or cooked[1, 2, 5, 11, 12]. Neither bitter nor sweet, the fruit is pleasantly acid and can be eaten out of hand, used in pies, preserves etc or dried for later use[183]. The juice is colourless[11]. The fruit is about 18mm in diameter and contains one large seed[200]. Seed - raw or cooked. Do not eat the seed if it is too bitter - see the notes above on toxicity. An edible oil is obtained from the seed[46, 61]. When refined it is used as a salad oil[183]. The leaves are used as a tea substitute[46, 61, 183]. A gum obtained from the trunk is used for chewing[61, 64].

tcanta Adhesive Dye Gum Gum Hedge Hedge Oil Oil WoodAn edible drying oil obtained from the seed is also used in cosmetics[61]. The gum obtained from the stem is also used as an adhesive[61, 64]. Plants can be grown as a hedge[50], succeeding in fairly exposed positions[K]. A green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168].

dwatta Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta S.E. Europe to W. Asia. ksacta Not known in the wild[11].

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[113]. Soft-wood cuttings from strongly growing plants in spring to early summer in a frame. Layering in spring. Division of suckers during the dormant season. They can be planted out direct into their permanent positions.

nwatta Thrives in a well-drained moisture-retentive loamy soil[11, 200]. Prefers some lime in the soil but is likely to become chlorotic if too much lime is present[1]. Prefers an acid soil according to another report[5]. Succeeds in sun or partial shade though it fruits better in a sunny position[11, 200]. Hardy to about -20°C[184]. This subspecies covers the cultivated bitter cherries known as Amarelle cherries - this includes those forms grown in Britain as Kentish Red cherries[11]. They have been long cultivated for their edible fruit and there are several named varieties[200]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. Plants produce suckers freely[184]. Plants in this genus are notably susceptible to honey fungus[200].

4.2.67 Malus prunifolia rinkii

Chinese Apple

3 tlin 7 cyuc 3 kcaak 0 tcan 0 dwat 8 m hkuc hmimhtut cyutli tcup hwicli hrasjltunykfrip hpa7tli flatprik-wis hpa7tmwatli xre7t hjonli

drutta Malus prunifolia rinkii is a deciduous Tree growing to 8 m (26ft) by 8 m (26ft). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from April to May, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All members of this genus contain the toxin hydrogen cyanide in their seeds and possibly also in their leaves, but not in their fruits. Hydrogen cyanide is the substance that gives almonds their characteristic taste but it should only be consumed in very small quantities. Apple seeds do not normally contain very high quantities of hydrogen cyanide but, even so, should not be consumed in very large

quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 105]. Bitter[200]. Not at all bitter; it makes quite pleasant eating[11]. Used fresh or in preserves etc[22, 46]. The fruit is about 3cm in diameter[200]. Young leaves - cooked[105, 177].

nrakta E. Asia - northern China. ksacta Not known in a truly wild state.

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

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[200]. Cultivated for its edible fruit in China, there are many named varieties[11, 22]. This species is a famous fruit tree in N and NE China[266]. Many cultivars have been bred during its long cultivation, the fruit of which differ in shape, color, size, and ripening period[266]. It is also used in apple breeding programmes for its frost resistance[74]. Hybridizes freely with other members of this genus[200]. The fruit is a good wildlife food source, especially for birds[200]. Plants in this genus are notably susceptible to honey fungus[200].

4.2.68 Prunus americana

American Plum, American Wild Plum, Wild Plum

3 tlin 8 cyuc 3 kcaak 3 tcan 2 dwat 6 m hkuc hmimhtut cyutli tcup hwicli hrasjltunyk hpa7tli flatprik-wis hpa7tmwatli xre7t hjonli

drutta Prunus americana is a deciduous Tree growing to 6 m (19ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in April, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: Fruit SeedEdible Uses: Fruit - raw, cooked in pies etc or used in preserves[1, 2, 55, 62, 183]. The flesh is succulent and juicy, though it is rather acid with a tough skin[85, 159]. The best forms are pulpy and pleasant tasting[183, 227]. The fruit is best cooked[159], and it can also be dried for later use[85]. The fruit is about 25mm in diameter and contains one large seed[200]. Seed - raw or cooked[85, 183]. Do not eat the seed if it is too bitter - see the notes above on toxicity.

tcanta Broom Disinfectant Dye Miscellany Rootstock Soil stabilization WoodA green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168]. A red dye can be obtained from the roots[257]. This species is widely used as a rootstock for cultivated plums in North America[160]. The tough, elastic twigs can be

bound into bundles and used as brooms for sweeping the floor[257]. Trees often grow wild along streams, where their roots tend to prevent soil erosion[226]. Wood - heavy, hard, close-grained, strong[82]. It weighs 45lb per cubic foot[227]. Of no commercial value because the trunk is too small[227].

dwatta Antiasmatic Astringent Disinfectant Diuretic Miscellany PouliticeA tea made from the scraped inner bark is used as a wash to treat various skin problems and as a mouth wash to treat sores[213]. A poultice of the inner bark is disinfectant and is used as a treatment on cuts and wounds[257]. The bark is astringent, diuretic and pectoral[257]. It has been used to make a cough syrup[257]. An infusion has been used in the treatment of diarrhoea, kidney and bladder complaints[257]. An infusion of the twigs has been used in the treatment of asthma[257]. Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta N. America - New York to Florida, extending westwards as far as the Rocky Mountains. ksacta Rich soils in mixed deciduous woodland, by streams, on the borders of swamps and in hedgerows[43, 62, 82].

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame. Difficult, if not impossible. Softwood cuttings from strongly growing plants in spring to early summer in a frame. Difficult, it not impossible. Suckers in late winter.

nwatta Landscape Uses:Border, Espalier, Pest tolerant, Specimen. Thrives in a well-drained moisture-retentive loamy soil, doing well on limestone[11, 200]. Prefers some lime in the soil but is likely to become chlorotic if too much lime is present[1]. Succeeds in sun or partial shade though it fruits better in a sunny position[11, 200]. Trees are probably hardy to as low as -50°C when fully dormant[160]. A fast-growing but short-lived tree in the wild[229], it is cultivated for its edible fruit in N. America, where there are many named varieties[1, 11, 46]. It flowers well in Britain but rarely fruits well here[11]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. Plants often produce suckers at the roots and form thickets[227]. The branches are brittle[101]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features: North American native, Edible, All or parts of this plant are poisonous, Attracts butterflies, Blooms are very showy. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A sprouting standard sending up shoots from the base [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

4.2.69 Malus pumila paradisiaca

Paradise Apple

3 tlin 7 cyuc 3 kcaak 2 tcan 0 dwat 5 m hkuc hmimhtut cyutli tcup hwicli hrasjltunykfrip hpa7tli flatprik-wis hpa7tmwatli xre7t hjonli

It cannot grow in the shade. It prefers moist soil and can tolerate drought. The plant can tolerate maritime exposure.

kcakta Edible Parts: Seed**Edible Uses:** Seed - cooked[105, 161, 177]. It can be ground into a flour and used to make bread. Quite fiddly to use, the seed is small and difficult to separate[K]. The seed was an important item of food for the Paiute Indians of south-western N. America[183].

tcanta Soil stabilizationThe plant has an extensive root system and can be used for binding sand dunes[61].

nrakta N. America - in most areas except the far south. Recorded, but not yet naturalized in N. Europe[50] **ksacta Dry sandy gravelly or rocky soil**[43]. Thickets and open woods in limestone and sandy clay soils in Texas[274].

propta Seed - sow mid spring in situ and only just cover the seed[162]. Germination should take place within 2 weeks. If the supply of seed is limited, it can also be sown in mid spring in a cold frame. Only just cover the seed. When large enough to handle, prick the seedlings out into individual pots and plant them out in summer[K] Division in spring or summer[62]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta An easily grown plant, it succeeds in most soils, preferring a sandy soil and a sunny position[1, 162]. Plants can flower too late to ripen their seed in Britain, especially in the western half of the country[K]. A polymorphic species[1].

4.2.168 *Osmunda claytoniana*

Interrupted Fern

3 tin 7 cyuc 2 kcaak 0 tcan 1 dwat 0.5 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli frusflatprikliwis hpa7tmwatli hjonli

drutta *Osmunda claytoniana* is a FERN growing to 0.5 m (1ft 8in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 3. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

pcista Although we have found no reports of toxicity for this species, a number of ferns contain carcinogens so some caution is advisable[200]. Many ferns also contain thiaminase, an enzyme that robs the body of its vitamin B complex. In small quantities this enzyme will do no harm to people eating an adequate diet that is rich in vitamin B, though large quantities can cause severe health problems. The enzyme is destroyed by heat or thorough drying, so cooking the plant will remove the thiaminase[172].

kcakta Edible Parts: Leaves **StemEdible Uses:** The young fronds are eaten[183]. Cooked as a vegetable[177, 272]. The centre of the clump, below ground level, is the source of a small edible pith called 'fern butter'[183].

dwatta VermifugeThe roots are used as an adulterant for *Dryopteris felix-mas* in the treatment of internal worms[240]. **nrakta E. Asia** - China, Japan, Himalayas. **Eastern N. America.** **ksacta Wet places** in C. Japan[58]. Open slopes, rarely in forests, 2800 - 3300 metres in Kashmir[145].

propta Spores - they very quickly lose their viability (within 3 days) and are best sown as soon as they are ripe on the surface of a humus-rich sterilized soil in a lightly shaded place in a greenhouse. Keep the compost moist, preferably by putting a plastic bag over the pot. Plants develop very rapidly, pot on small clumps of plantlets as soon as they are large enough to handle and keep humid until they are well established. Do not plant outside until the ferns are at least 2 years old. Cultivars usually come true to type[200]. Division of the rootstock in the dormant season. This is a very strenuous exercise due to the mass of warty roots[200].

nwatta Likes a soil of swamp mud and loamy or fibrous peat, sand and loam[1]. Succeeds in most moist soils, preferring acid conditions[200]. Requires a constant supply of water, doing well by ponds, streams etc[1]. Plants thrive in full sun so long as there is no shortage of moisture in the soil and also in shady situations beneath shrubs etc[200]. Requires a shady position[188]. Plants are hardy to at least -20°C, they are evergreen in warm winter areas but deciduous elsewhere[200]. Members of this genus are rarely if ever troubled by browsing deer[233]. A very ornamental plant[1].

4.2.169 *Achillea ptarmica*

Sneeze-Wort, Sneezeweerd

3 tin 9 cyuc 2 kcaak 2 tcan 1 dwat 0.6 m hkuc htut cyutli tcup hwicli hyishrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta *Achillea ptarmica* is a PERENNIAL growing to 0.6 m (2ft) by 0.6 m (2ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Leaves**Edible Uses:** Leaves - raw or cooked[17, 105, 177]. Used as a flavouring in salads[172].

tcanta Essential Hair Miscellany RepellentThe dried, powdered leaves are used as a sneezing powder[61, 100]. Yields an essential oil that is used medicinally[100]. The report does not say what part of the plant the oil is obtained from, it is most likely to be the leaves harvested just before flowering[K]. The leaves are used as an insect repellent[172].

dwatta Antidiarrhoeal Antiemetic Antifilutent Antirheumatic Appetizer Cardiac Diaphoretic Digestive Emmenagogue Miscellany Odontalgic Sternutatory StypticCardiac, diaphoretic, digestive, emmenagogue, odontalgic, sternutatory, styptic[46, 172]. The leaf is chewed to relieve toothache[207].

nrakta Europe, including Britain but excluding the Mediterranean, east to Siberia and W. Asia. **ksacta Damp meadows, marshes and by streams**[17].

propta Seed - sow spring or early autumn in a cold frame[133]. The seed usually germinates in 1 - 3 months[133]. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn. Very easy, the divisions can be planted direct into their permanent positions. Basal cuttings of new shoots in spring. Very easy, collect the shoots when they are about 10cm tall, potting them up individually in pots and keeping them in a warm but lightly shaded position. They should root within 3 weeks and will be ready to plant out in the summer.

nwatta Landscape Uses:Border, Container, Rock garden, Seashore, Specimen. Succeeds in most soils but prefers a moist well-drained soil in a sunny position[1, 187]. Plants also succeed in partial shade[187]. Plants succeed in maritime gardens[233]. They live longer when growing in a poor soil[200]. The plant has a spreading root system and can be very invasive[233]. Hardy to at least -25°C[187]. There are some named varieties, selected for their ornamental value[233]. Hybridizes freely with other members of this genus[200]. **Special Features:**Not North American native, Invasive, Naturalizing, Attracts butterflies, Suitable for cut flowers, Suitable for dried flowers. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

4.2.170 *Hypericum perforatum*

St. John's Wort, Common St. Johnswort

3 tin 7 cyuc 2 kcaak 2 tcan 4 dwat 0.9 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

tcanta TeethThe fruits are used as a tooth cleaner[55, 62]. They are held in the mouth, or rubbed over the teeth, to remove tartar[257]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Antiseptic Astringent Emmenagogue Galactagogue Odontalgic Poultice Vitamin CThe whole plant is antiseptic, astringent, emmenagogue, galactagogue and odontalgic[172]. It has been used to regulate the menstrual cycle[172]. A tea made from the leaves has been used as a nerve tonic and is slightly astringent[222]. A poultice made from the dried powdered leaves mixed with oil has been used to treat open sores[257]. A tea made from the roots is diuretic[222]. It has been used in the treatment of diarrhoea, irregular menses, gonorrhoea, stomach and lung ailments[222, 257].

nrakta Eastern N. America - Newfoundland to South Dakota, south to Florida and Oklahoma. **ksacta Fields, open slopes and woodland edges**[43].

propta Seed - sow early spring in a greenhouse. The seed can take 4 weeks or more to germinate. The seedlings are very small and slow-growing at first, but then grow rapidly. Prick them out into individual pots when they are large enough to handle and plant them out during the summer. Division of runners, preferably done in July/August in order to allow the plants to become established for the following years crop[200]. They can also be moved in the following spring if required, though should not then be allowed to fruit in their first year. The runners can be planted out direct into their permanent positions.

nwatta Prefers a fertile, well-drained, moisture retentive soil in a sunny position[27, 200]. Tolerates semi-shade though fruit production will be reduced when plants grow in such a position. The plants appreciate a mulch of pine or spruce leaves[181]. Along with *F. chiloensis*, this species is probably a parent of the cultivated strawberries. The cultivar 'Little Scarlet' is a form of this species and this is still occasionally cultivated for its fruit in Britain[119]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. An evergreen. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2].

4.2.99 *Galium verum*

Lady's Bedstraw, Yellow Spring bedstraw, Wirtgen's bedstraw

3 tin 7 cyuc 3 kcaak 0 tcan 2 dwat 0.6 m hkuc hmimhtut cyutli kyuctuc hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

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

kcakta Edible Parts: Leaves **SeedEdible Uses:** Coffee Colouring Curdling agent DrinkLeaves - raw or cooked[62, 179]. A yellow dye from the flowering stems is used as a food colouring[105, 183]. The roasted seed is a coffee substitute[7]. The seed is also said to be edible[179]. The chopped up plant can be used as a rennet to coagulate plant milks[7, 67, 115, 183, 244]. The flowering tops are distilled in water to make a refreshing acid beverage[2, 183].

tcanta Dye Repellent Strewing StuffingA red dye is obtained from the root[4, 6, 7, 67, 115]. It is rather fiddly to utilize[169]. A yellow dye is obtained from the flowering tops[4, 7, 115]. The dye is obtained from the foliage when it is boiled with alum[207]. The dried plant has the scent of newly mown hay, it was formerly used as a strewing herb[24] and for stuffing mattresses etc[61, 67, 115]. It is said to keep

fleas away[207]. A sprig in a shoe is said to prevent blisters[67].

dwatta Antispasmodic Astringent Diuretic Epilepsy Foot care Lithontripic Urinary VulneraryLady's bedstraw has a long history of use as a herbal medicine, though it is little used in modern medicine. Its main application is as a diuretic and as a treatment for skin complaints[254]. The leaves, stems and flowering shoots are antispasmodic, astringent, diuretic, foot care, lithontripic and vulnerary[4, 7, 9]. The plant is used as a remedy in gravel, stone or urinary disorders[4, 9, 53, 238] and is believed to be a remedy for epilepsy[4, 21]. A powder made from the fresh plant is used to soothe the reddened skin and reduce inflammation[7] whilst the plant is also used as a poultice on cuts, skin infections, slow-healing wounds etc[9]. The plant is harvested as it comes into flower and is dried for later use[9]. Both Asperuloside (a terpenoid) and Coumarin (a benzopyrone) occur in some species of *Galium*. Asperuloside can be converted into prostaglandins (hormone-like compounds that stimulate the uterus and affect blood vessels), making the genus of great interest to the pharmaceutical industry[238].

nrakta Most of Europe, including Britain, to W. Asia. **ksacta Waste ground, roadsides etc**[7], mainly near the sea[4], on all but the most acid soils[17].

propta Seed - best sown in situ as soon as it is ripe in late summer[200]. The seed can also be sown in situ in the spring though it may be very slow to germinate[200]. Division in spring. The plant can be successfully divided throughout the growing season if the divisions are kept moist until they are established[200]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Prefers a loose moist leafy soil in some shade, but it tolerates a position in full sun[14]. Plants are tolerant of dry soils[1], but do not thrive in a hot climate. They dislike very acid soils[17, 53]. A very invasive plant[1], though it is low-growing and mixes without harm with any plants at least 60cm tall[K]. It grows well in the summer meadow[24] and is a food plant for the larvae of several species of butterflies[30].

4.2.100 *Viola cucullata*

Marsh Blue Violet

3 tin 8 cyuc 3 kcaak 3 tcan 1 dwat 0.2 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta *Viola cucullata* is a PERENNIAL growing to 0.2 m (0ft 8in) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from May to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects, Cleistogomy (self-pollinating without flowers ever opening). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: Flowers **LeavesEdible Uses:** TeaYoung leaves and flower buds - raw or cooked[61, 105]. When added to soup they thicken it in much the same way as okra[85, 159, 177]. A tea can be made from the leaves[85].

tcanta RepellentA good ground cover plant but it is slow to thicken up and may need weeding for the first year and so[197]. An infusion of the root has been used to soak corn seeds before planting them in order to keep off insects[257]. **Faunal Associations:** The floral nectar of Marsh Violet attracts bumblebees, mason bees (*Osmia* spp.), Halictid bees, Andrenid bees, bee flies (*Bomblyliidae*), butterflies, and skippers (Robertson, 1929). Some of the bees also collect pollen. An oligolectic bee, *Andrena violae*, visits the flowers of Marsh Violet and other *Viola* spp. (violets). The caterpillars of several *Fritillary* butterflies feed on the foliage of violets primarily in open areas: *Boloria bellona* (Meadow *Fritillary*), *Boloria selene myrina* (Silver-Bordered *Fritillary*), *Euptoieta claudia* (Variegated *Fritillary*), *Speyeria aphrodite* (Aphrodite *Fritillary*), *Speyeria atlantis* (Atlantis *Fritillary*), *Speyeria cybele* (Great Spangled *Fritillary*), and *Speyeria idalia* (Regal *Fritillary*). Other insect feeders include caterpillars of the moths *Elaphria grata* (Grateful Midget) and *Eubaphe mendica* (The

Beggar), the leaf-mining larvae of *Ametastegia pallipes* (Violet Sawfly), the aphid *Neotoxoptera violae*, and the thrips *Odontothrips pictipennis*. The seeds and other parts of violets are occasionally eaten by such birds as the Ruffed Grouse, Wild Turkey, and Mourning Dove, and they are also consumed by the White-Footed Mouse, Pine Mouse, and Eastern Chipmunk. Similarly, the foliage of these low-growing plants is a source of food for the Cottontail Rabbit and Wood Turtle (*Clemmys insculpta*) [1-6].

dwatta Analgesic Dysentery PoulticeAn infusion of the plant has been used in the treatment of coughs, colds and dysentery[257]. A poultice of the leaves has been used to reduce the pain of headaches[257]. A poultice of the crushed root has been applied to boils[257].

nrakta Eastern N. America - Quebec to Ontario and south to Georgia. ksacta Wet places, often in open woods[187]. Wet meadows, springs, bogs, swamps etc[43].

propta Seed - best sown in the autumn in a cold frame. Sow stored seed in early spring in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. Division in the autumn or just after flowering. Larger divisions can be planted out direct into their permanent positions, though we have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring.

nwatta Prefers a cool moist well-drained humus-rich soil in partial or dappled shade and protection from scorching winds. Very intolerant of drought[187]. Succeeds in dense shade[197]. Tolerates sandstone and limestone soils but becomes chlorotic if the pH is too high. Prefers a pH between 6 and 6.5. This plant produces cleistogamous flowers as well as the usual insect pollinated flowers[187]. It usually self-sows freely[188]. All members of this genus have more or less edible leaves and flower buds, though those species with yellow flowers can cause diarrhoea if eaten in large quantities[62, 85, 159]. A polymorphic species[188], there are many named forms, selected for their ornamental value[200].

4.2.101 Ribes fragrans

3 tlin 7 cyuc 3 kcaak 0 tcan 0 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Ribes fragrans is a deciduous Shrub growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 3. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[177]. A gooseberry with a sweet and pleasant flavour[2, 105]. The fruit is about 8mm in diameter[200].

nrakta E. Asia - Mongolia, Siberia. ksacta Mountain slopes among rocks and on stony taluses to lower parts of the bald mountain zone[74].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. Stored seed requires 4 - 5 months cold stratification at between 0 to 9°C and should be sown as early in the year as possible[113, 164]. Under normal storage conditions the seed can remain viable for 17 years or more. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter, planting them out in late spring of the following year. Cuttings of half-ripe wood, 10 - 15cm with a heel, July/August in a frame[78, 113]. Cuttings of mature wood of the current year's growth, preferably with a heel of the previous year's growth, November to February in a cold frame or sheltered bed outdoors[78, 200].

nwatta Easily grown in a moisture retentive but well-drained loamy soil of at least moderate quality[11, 200]. Plants are quite tolerant of shade though do not fruit so well in such a position[11]. Hardy to about -20°C[200]. The whole plant is aromatic with a smell reminiscent of balm[200]. This species is closely related to *R. hudsonianum*[200]. Plants can harbour a stage of 'white pine blister rust', so they should not be grown in the vicinity of pine trees[155]. Plants in this genus are notably susceptible to honey fungus[200].

4.2.102 Asarum canadense

Snake Root, Canadian wildginger, Canada Wild Ginger, Wild Ginger

3 tlin 9 cyuc 3 kcaak 3 tcan 3 dwat 0.1 m hkuc pcmhmmim cyutli tcup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Asarum canadense is a deciduous Perennial growing to 0.1 m (0ft 4in) by 0.5 m (1ft 8in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 2. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

pcista The leaves are poisonous[19]. Handling the leaves is said to cause dermatitis in some people[269].

kcakta Edible Parts: Edible Uses: CondimentThe underground stem and the flowers are used as a ginger substitute[2, 55, 106, 177, 183]. The root, especially when quite dry, has a pungent, aromatic smell like mild pepper and ginger mixed, but more strongly aromatic[245]. The root is best harvested in autumn but is available all year round[159]. It can be dried for later use[159].

tcanta IncenseThe slightly roasted root can be ground into a powder and then sprinkled onto clothing for perfume[257]. A useful ground cover for a shady position so long as it is not dry[197], spreading by its roots[208].

dwatta Anthelmintic Antiasthmatic Antibiotic Antitumor Carminative Contraceptive Diaphoretic Diuretic Expectant Irritant Poultice Salve Stimulant Stomachic TonicSnake root was widely employed as a medicinal herb by a number of native North American tribes who used it to treat a wide range of ailments[257]. It is still occasionally used in modern herbalism. The root is anthelmintic, carminative, diaphoretic, diuretic, expectorant, irritant, powerfully stimulant, stomachic and tonic[4, 21, 46, 200, 238, 257]. It is harvested in the autumn and dried for later use[4]. It is used in the treatment of chronic chest complaints, asthma, coughs, colds, dropsy, painful spasms of the bowels and stomach, scant or painful menstruation, infantile convulsions[4, 257]. The fresh leaves are applied as a poultice to wounds and inflammations, whilst a decoction or salve is applied to sores[257]. The root contains antibiotic substances effective against broad-spectrum bacteria and fungi[207]. It also contains aristolochic acid, which has antitumor activity[222]. The root and rhizome were slowly boiled in a small quantity of water for a long time and the resulting liquid drunk as a contraceptive by the women of one N. American Indian tribe[213].

nrakta Eastern N. America - Manitoba to New Brunswick, south to N. Carolina and Kansas. ksacta Moist rich soils in woodlands, usually on calcareous soils[43, 159]. Understorey of deciduous (rarely coniferous) forests from sea level to 1300 metres[270].

propta Seed - best sown in a cold frame as soon as it is ripe in the summer[134]. Stored seed will require 3 weeks cold stratification and should be sown in late winter[134]. The seed usually germinates in the spring in 1 - 4 or more weeks at 18°C[134]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for at least their first winter. Plant them out when large enough in late spring. Division in spring or autumn. Plants are slow to increase[200]. It is best to pot the divisions up and keep them in light shade in the greenhouse until they are growing away strongly.

nwatta Landscape Uses:Ground cover, Massing, Rock garden, Woodland garden. Prefers a rich moist neutral to acid soil in woodland or a shady position in the rock garden[1, 200]. Plants are found on alkaline soils in the wild[43]. Plants are hardy to at least -25°C[200]. The flowers are malodorous and are pollinated by flies[200]. Plants often self-sow when growing in a suitable position[200]. Special Features:Attractive foliage, North American native, Naturalizing, Inconspicuous flowers or blooms. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of

4.2.164 Leucanthemum vulgare

Ox-Eye Daisy, Marguerite

3 tlin 9 cyuc 2 kcaak 2 tcan 2 dwat 0.6 m hkuc htut cyutli tcup hwicli hrasljutnyik hpa7tli prikliwis hpa7tmwatli fyifxre7t hjonli

drutta Leucanthemum vulgare is a PERENNIAL growing to 0.6 m (2ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

kcakta Edible Parts: Leaves RootEdible Uses: Leaves - raw or cooked[2, 115]. The young spring shoots are finely chopped and added to salads[4, 7, 183]. Rather pungent[9], they should be used sparingly or mixed with other salad plants[183]. Root - raw[5]. Used in spring[207].

tcanta Groundcover and Specialist Nectary. Landscape Uses:Ground cover, Massing. Special Features:Invasive, Naturalizing, Attracts butterflies, Suitable for cut flowers.

dwatta Antispasmodic Antitussive Diaphoretic Diuretic Emmenagogue Tonic VulneryThe whole plant, and especially the flowers[7], is antispasmodic, antitussive, diaphoretic, diuretic, emmenagogue, tonic and vulnerary[4, 7, 21]. It is harvested in May and June then dried for later use[4]. The plant has been employed successfully in the treatment of whooping cough, asthma and nervous excitability[4]. Externally it is used as a lotion on bruises, wounds, ulcers and some cutaneous diseases[4, 7]. A decoction of the dried flowers and stems has been used as a wash for chapped hands[257]. A distilled water made from the flowers is an effective eye lotion in the treatment of conjunctivitis[7].

nrakta Europe, including Britain, from Lapland south and east to the Mediterranean and Siberia. ksacta A common weed of grassy fields on all the better types of soil, avoiding acid soils and shade[17].

propta Seed - sow spring in a greenhouse. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring. Basal cuttings in spring. Harvest the shoots when they are about 10cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Easily grown in a good garden soil in a sunny position[187]. Prefers a rich soil[17]. Plants are hardy to at least -20°C[187]. The whole plant is permeated with an acrid juice, making it obnoxious to insects[4]. The flowers have a smell like stale perspiration[245]. Grows well in the summer meadow but may need some help in maintaining itself[24]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [2-1].

4.2.165 Geum canadense

White Avens, Texan avens

3 tlin 7 cyuc 2 kcaak 0 tcan 0 dwat 0.8 m hkuc hmimhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Geum canadense is a PERENNIAL growing to 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Edible Uses: ChocolateThe boiled roots are a chocolate substitute[183]. The roots are also gathered in spring before the plant comes into growth and are used as a flavouring and preservative in ale[207].

nrakta Eastern N. America - Nova Scotia to Ontario, Georgia, Minnesota and Kansas. ksacta Rich thickets and borders of woods in various soils[204, 274].

propta Seed - sow spring or autumn in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer' Division in spring or autumn. This should be done every 3 - 4 years in order to maintain the vigour of the plant[200]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Easily grown in any moderately good garden soil that is well-drained[1]. Prefers a soil rich in organic matter[200]. Plants are hardy to at least -15°C[200]. Hybridizes freely with other members of this genus[200].

4.2.166 Primula elatior

Oxlip

3 tlin 7 cyuc 2 kcaak 0 tcan 2 dwat 0.3 m hkuc pcmhmmim cyutli tcup hwicli jlutnyikfrp hpa7tli flatprikliwisslip hpa7tmwatli fyifxre7t hjonli

drutta Primula elatior is a PERENNIAL growing to 0.3 m (1ft) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from April to May, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young leaves - raw or cooked in soups etc[13]. They have a mild flavour and are available in late winter[K].

dwatta Diuretic Expectorant MiscellanyThe root is diuretic and expectorant[9, 13]. It is used in the treatment of coughs, flu and other febrile conditions, insomnia and migraine[9, 13]. The root can be harvested in the spring or autumn and is dried for later use[9].

nrakta Europe, including Britain, from Sweden to the Alps and S. Russia. ksacta Woods and meadows on chalky boulder clay[17, 50].

propta Seed - best sown as soon as it is ripe in a cold frame[133]. Sow stored seed in early spring in a cold frame[1]. Germination is inhibited by temperatures above 20°C[200]. Prick out the seedlings into individual pots when large enough to handle and plant out in the summer. Division in autumn. This is best done every other year[200].

nwatta Prefers a medium to heavy moisture retentive humus rich loam in a cool position with light to medium shade[200], though it succeeds in heavier shade[187]. Grows well in heavy clay soils and in chalky soils[187]. A very ornamental plant[1], there are a number of subspecies[187]. The subspecies *P. elatior meyeri* is a parent of the *P. x pruhonicensis* group of ornamental hybrids[187]. This species hybridizes readily with *P. vulgaris*[17].

4.2.167 Elymus canadensis

Canadian Wild Ryegrass

3 tlin 7 cyuc 2 kcaak 0 tcan 0 dwat 0.8 m hkuc htut cyutli hgattcup hwicli hyishrasljutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Elymus canadensis is a PERENNIAL growing to 0.8 m (2ft 7in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from July to August, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils.

smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Requires a cool shady moist but not wet position[1, 187]. Plants tolerate warm summers only if the soil remains moist[200]. A mat forming plant, it can be invasive in good conditions[200].

4.2.161 *Filipendula vulgaris*

Dropwort, Meadowsweet

3 tin 10 cyuc 2 kcaak 0 tcan 1 dwat 0.8 m hkuac htut cyutli kyuctcup hwicli hrasjlutnyikfrp hpa7tli prik-wisslip hpa7tmwatli fyifxre7t hjonli

drutta *Filipendula vulgaris* is a PERENNIAL growing to 0.8 m (2ft 7in) by 0.4 m (1ft 4in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from May to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: Leaves RootEdible Uses: Young leaves - raw or cooked[61, 177, 200]. They can be added to salads and soups[183]. Root - raw or cooked[61, 115, 177, 200]. Rather bitter[5]. Astrigent[100]. Best if roasted[141]. A famine food, it is only used in times of scarcity[183].

tcanta Plants can be used as a ground cover when planted about 45cm apart each way[208]. The cultivar 'Flore Pleno' with sweetly scented double flowers has been recommended[208].

dwatta Anthelmintic Antispasmodic Epilepsy LithotropicThe root is anthelmintic and lithotropic. It is used in the treatment of epilepsy, kidney and bladder stones, genital discharges and intestinal worms[61].

nrakta Europe, including Britain, from Scandanavia south and east to N. Africa, Siberia and the Caucasus. ksacta Dry pastures on limestone or chalky soils[4].

propta Seed - best sown in the autumn in a cold frame[1]. The seed can also be sown in a cold frame in spring, germinating best at a temperature of 10 - 13°C[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer if they have grown enough. If not, keep them in a cold frame for the winter and plant them out in late spring. Division in autumn or winter[200]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Landscape Uses:Massing, Rock garden. Prefers a well-drained moisture retentive soil[200]. Dislikes shade[17]. Tolerates dry soils[200]. Grows well on calcareous soils[17]. The flowers are sweetly scented and are very attractive to bees[245]. Members of this genus are rarely if ever troubled by browsing deer[233]. Special Features: Attractive foliage, Naturalizing, Suitable for cut flowers.

4.2.162 *Zizia aurea*

Golden Alexanders, Golden zizia

3 tin 7 cyuc 2 kcaak 0 tcan 1 dwat 0.8 m hkuac htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikkwis hpa7tmwatli fyifxre7t hjonli

drutta *Zizia aurea* is a PERENNIAL growing to 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista There is a report that the root might be toxic[222]. kcakta Edible Parts: FlowersEdible Uses: The flowers, with the main stem removed, are a welcome addition to a tossed green salad. They are also a delicious cooked vegetable when used in a similar manner to broccoli[183].

dwatta Febrifuge Hypnotic VulneraryA tea made from the root is febrifuge[222, 257]. The root is also believed to be vulnerary and hypnotic[222].

nrakta Eastern N. America - Quebec to Saskatchewan and south to Texas and Florida.. ksacta Moist meadowland[200]. Dry woods and rocky outcrops[222]. Low woods in Texas[274].

propta Seed - we have no information for this species but it is probably best sown in spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts.

nwatta Requires a moist soil and a position in full sun[200]. Suitable for the wild garden and other informal plantings as well as collections of native wild flowers[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. An evergreen. The plant growth habit is a clumper with limited spread [1-2].

4.2.163 *Bergenia crassifolia*

Siberian Tea

3 tin 7 cyuc 2 kcaak 0 tcan 0 dwat 0.3 m hkuac pcmhmmhtut cyutli hgattcup hwicli hrasjlutnyikfrp hpa7tli flatprikkwis hpa7tmwatli xre7t hjonli

drutta *Bergenia crassifolia* is an evergreen Perennial growing to 0.3 m (1ft) by 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in leaf all year, in flower from March to April. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought.

kcakta Edible Parts: Edible Uses: TeaThe leaves are used as a tea substitute[2, 61, 105, 177, 183].

tcanta TanninA useful ground cover plant[188], though rather slow to spread[197]. It forms a clump[208]. Tannin is obtained from the bark[61]. The roots contain 15 - 22% tannin, exceptionally 26%[223]. The leaves and stems contain 17 - 25% tannin[223].

nrakta E. Asia - N.W. China to Siberia. ksacta On shady north-facing rocks, stony slopes, rock streams and old moraines in the forest and alpine zones[74].

propta Seed - surface sow in a greenhouse. Make sure that the compost does not dry out. Two weeks cold stratification can speed up germination which usually takes 1 - 6 months at 15°C[134]. Fresh seed, sown as soon as it is ripe in late spring is liable to germinate better than stored seed. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in late spring after flowering[188] or in autumn[200]. Very easy, larger divisions can be planted straight into their permanent positions whilst smaller clumps are best potted up and kept in a cold frame until they are growing away well.

nwatta Succeeds in full sun or light shade in most soils[134, 200] but prefers a deep fertile soil that does not dry out fully[134]. Established plants are drought tolerant according to another report[190]. Grows well in heavy clay soils. Plants are at their best in a medium-heavy soil[208]. Requires a position sheltered from cold drying winds and from the early morning sun. The leaf colour is best when plants are grown in a poor soil in a sunny position[188]. A very ornamental plant, it is hardy to about -20°C[187]. The young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. Plants seem to be immune to the predations of rabbits[233]. The different species of this genus will hybridise freely when grown near each other[233].

"heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

4.2.103 *Rubus flagellaris*

Northern Dewberry

3 tin 7 cyuc 3 kcaak 1 tcan 1 dwat 0.2 m hkuac hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikkwis hpa7tmwatli xre7t hjonli

drutta *Rubus flagellaris* is a deciduous Shrub growing to 0.2 m (0ft 8in) by 2 m (6ft). See above for USDA hardiness. It is hardy to UK zone 3. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects, Apomictic (reproduce by seeds formed without sexual fusion). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit StemEdible Uses: TeaFruit - raw or cooked in pies, preserves etc[46, 61, 105, 161, 171, 183, 257]. A rich flavour[43]. The fruit is about 15mm in diameter[200]. Young shoots - peeled and eaten raw[183]. They are harvested as they come through the ground in spring and whilst they are still young and tender. The dried leaves make a fine tea[183].

tcanta DyeA purple to dull blue dye is obtained from the fruit[168]. A black dye is obtained from the green twigs[207].

dwatta Antihæmorrhoidal Antirheumatic Astringent Stimulant Tonic VDThe root is astringent, stimulant and tonic[257]. An infusion has been used in the treatment of diarrhoea, venereal disease and rheumatism[257]. An infusion has been used as a wash in the treatment of piles[257]. The root has been chewed as a treatment for a coated tongue[257]. The leaves are astringent[257]. An infusion has been used in the treatment of diarrhoea[257].

nrakta Eastern N. America. ksacta Dry fields, openings and borders of thickets[43] in slightly acid soils[159].

propta Seed - requires stratification and is best sown in early autumn in a cold frame. Stored seed requires one month stratification at about 3°C and is best sown as early as possible in the year. Prick out the seedlings when they are large enough to handle and grow on in a cold frame. Plant them out into their permanent positions in late spring of the following year. Cuttings of half-ripe wood, July/August in a frame[200]. Tip layering in July. Plant out in autumn. Division in early spring or just before leaf-fall in the autumn[200].

nwatta Easily grown in a good well-drained loamy soil in sun or semi-shade[1, 11, 200]. A very polymorphic species[43], it is sometimes cultivated for its edible fruit and there are some named varieties[1, 171, 183]. This species is a blackberry with biennial stems, it produces a number of new stems each year from the perennial rootstock, these stems fruit in their second year and then die[200]. The plant produces apomictic flowers, these produce fruit and viable seed without fertilization, each seedling is a genetic copy of the parent[200]. Plants in this genus are notably susceptible to honey fungus[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a running thicket former forming a colony from shoots away from the crown spreading indefinitely [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

4.2.104 *Geum rivale*

Water Avens, Purple avens

3 tin 7 cyuc 3 kcaak 1 tcan 2 dwat 0.3 m hkuac hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatprikkwis hpa7tmwatli fyifxre7t hjonli

drutta *Geum rivale* is a PERENNIAL growing to 0.3 m (1ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from May to September, and the seeds ripen from June to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: Edible Uses: Chocolate Condiment DrinkThe dried or fresh root can be boiled in water to make a delicious chocolate-like drink[85, 95, 106, 183, 213]. It can also be used as a seasoning[102, 183]. It is best harvested in the spring or autumn but can be used all year round[213]. Fragrant[161], it was once used to flavour ales[2, 183].

tcanta RepellentThe dried root repels moths. Plants are suitable for ground cover when spaced about 30cm apart each way[208]. The cultivar 'Leonard's Variety' is the best for this purpose[208].

dwatta Antidiarrhoeal Antinflammatory Antiseptic Aromatic Astringent Diaphoretic Febrifuge Stomachic Styptic TonicThe root is anti-inflammatory, antiseptic, aromatic, astringent, diaphoretic, febrifuge, stomachic, styptic and tonic[4, 21]. An infusion is taken internally in the treatment of diarrhoea (and is suitable for children to use), intestinal and stomach complaints, liver disorders etc, it is also applied externally as a wash to various skin afflictions - it is said to remove spots, freckles and eruptions from the face[4, 9]. This plant has similar properties but is less active than the related *G. urbanum* and so is seldom used medicinally[9, 238]. The root is best harvested in the spring, since at this time it is most fragrant[4]. Much of the fragrance can be lost on drying, so the root should be dried with great care then stored in a cool dry place in an airtight container, being sliced and powdered only when required for use[4]. The root is rich in tannin and is a powerful astringent[213, 222].

nrakta Europe, including Britain, from Iceland south and east to Spain, Siberia and W. Asia. N. America. ksacta Damp places, such as moist ditches and streambanks, most frequently in the shade[9, 17].

propta Seed - sow spring or autumn in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer' Division in spring or autumn. This should be done every 3 - 4 years in order to maintain the vigour of the plant[200]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Easily grown in any moderately good garden soil that is well-drained[1]. Easily grown in a moist or shady border[28, 187]. Prefers a soil rich in organic matter[200]. Prefers a base rich soil[17]. Hybridizes freely with other members of this genus, especially with *G. urbanum*[187]. There are some named varieties selected for their ornamental value[208, 233]. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

4.2.105 Parthenocissus quinquefolia

Virginia Creeper; Woodbine

3 tlin 10 cyuc 2 kcaak 0 tcan 2 dwat 30 m hkuc hmimhtut cyutili tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Parthenocissus quinquefolia is a deciduous Climber growing to 30 m (98ft 5in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from June to August, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acidic, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. It can tolerate atmospheric pollution.

pcista Skin contact with the leaves in autumn can cause dermatitis in some people[222]. The tissues of the plant contain microscopic, irritating needle-like crystals called raphides[274]. Some evidence suggests the berries are poisonous [301].

kcakta Edible Parts: Fruit Root StemEdible Uses: Fruit - raw[105, 161]. The fruit is not very well flavoured, nor is it produced very freely[K]. The fruit is about 6mm in diameter[200] and is carried in small bunches like grapes[K]. Stalks - cooked. They should be peeled and then boiled[105, 161]. The stalks are cut, boiled and peeled, and the sweetish substance between the bark and the wood is used for food[257]. Root - cooked[257].

tcanta DyeA pink dye is obtained from the fruit[46, 61, 257]. The plant can be allowed to fall down banks and make a spreading ground cover[202]. They are best spaced about 3 metres apart each way[208]. They are very vigorous, however, and would soon swamp smaller plants[K].

dwatta Alternative Astringent Diuretic Expectorant TonicThe bark and fresh young shoots are aperient, alterative, emetic, expectorant and tonic[46, 61]. A hot decoction can be used as a poultice to help reduce swellings[257]. A tea made from the leaves is aperient, astringent and diuretic[222]. It is used as a wash on swellings and poison ivy rash[222, 257]. A tea made from the plant is used in the treatment of jaundice[222, 257]. A tea made from the roots is used in the treatment of gonorrhoea and diarrhoea[222, 257]. The fruit is useful in treating fevers[4]. Some evidence suggests the berries (due to oxalic acid content)are poisonous [301].

nrakta Eastern N. America - Quebec to Florida and Mexico. A garden escape in Britain. ksacta Woods and rocky banks[43].

propta Seed - best sown as soon as it is ripe in a cold frame[200]. Stored seed requires stratifying for 6 weeks at 5°C and should be sown as early in the year as possible[200]. Germination is variable. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm taken at a node (ensure that it has at least 2 true buds), July/August in a frame[78]. Easy to root but they do not always survive the first winter[182]. Basal hardwood cuttings of current seasons growth, 10 - 12 cm long, autumn in a frame[200]. Layering[200]. Plants often self-layer[202].

nwatta Landscape Uses:Arbor, Woodland garden. Requires a well-drained moisture retentive fertile soil[200]. Succeeds in most soils, preferring full sun but tolerating semi-shade[202]. Best if grown in semi-shade on an east or west facing wall[200]. Tolerates atmospheric pollution[4]. Dormant plants are hardy to about -25°C[200], though the young growth in spring can be damaged by late frosts. A very ornamental plant[1], it is self-supporting on walls by means of adhesive tendrils[1, 182]. Very fast growing, though it often does not grow very much in its first year or two after planting out[202]. When established, it can send out new growth 6 metres long in a year[4]. The plant can, however, become a nuisance by climbing into gutters[182]. Plants are very tolerant of trimming and can be cut right back to the base if required to rejuvenate the plant[202]. Any pruning is best carried out in the spring[219]. The fruit is normally only produced after a long hot summer[219]. There are several named varieties[182]. Special Features:Attracts birds, North American native, Inconspicuous flowers or blooms.

4.2.106 Populus deltoides

Eastern Cottonwood, Plains cottonwood, Rio Grande cottonwood, Necklace Poplar

3 tlin 9 cyuc 2 kcaak 4 tcan 2 dwat 30 m hkuc htut cyutili tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli nyanhjen hjonli

drutta Populus deltoides is a deciduous Tree growing to 30 m (98ft) by 20 m (65ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 2. It is in flower from March to April, and the seeds ripen from May to June. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acidic, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

kcakta Edible Parts: Inner Bark Leaves SeedEdible Uses: Inner bark[105, 161, 177, 257]. A mucilaginous texture, it is usually harvested in the spring[257]. There are no more details but inner bark is often dried, ground into a powder and then used as a thickener in soups etc or added to cereals when making bread. Seeds[105, 161, 177]. No more details are given but they are very small and would be exceedingly fiddly to collect and use. Sap - used for food[257]. Buds[105, 161, 177]. No more details are given. The leaves are rich in protein and have a greater amino-acid content than wheat, corn, rice and barley[226]. A concentrate made from them is as nourishing as meat, but can be produced faster and more cheaply[226]. Some people believe that this will become a major food source for humans[226].

tcanta Biomass Dye Pioneer Rooting hormone Shelterbelt Soil stabilization WoodAn extract of the shoots can be used as a rooting hormone for all types of cuttings. It is extracted by soaking the chopped up shoots in cold water for a day[172]. Various dyes can be obtained from the leaf buds in the spring - green, white, yellow, purple and red have been mentioned[257]. Trees are planted for dune fixing in erosion control programmes[149, 227]. They are also good pioneer species, growing quickly to provide a good habitat for other woodland trees and eventually being out-competed by those trees[229]. A fairly wind resistant tree, it can be grown as part of a shelterbelt planting[200, 269]. Another report says that it is easily storm-damaged[227]. The wood has been used as a bio-mass for producing methanol, which can be used to power internal combustion engines[226]. Annual yields of 7 tonnes of oven-dry material per year have been achieved[269]. Wood - weak, soft, rather woolly in texture, without smell or taste, of low flammability, not durable, very resistant to abrasion but warps and shrinks badly[11, 149, 171, 227]. It weighs 24lb per cubic foot[235]. The wood takes paint well, is easy to glue and nail[227]. It is used principally for lumber, pulp, crates, veneer etc[11, 149, 171].

dwatta Anodyne Anthelmintic Antiinflammatory Antiscorbutic Blood purifier Febrifuge Poultice TonicThe bark contains salicin, a glycoside that probably decomposes into salicylic acid (aspirin) in the body[222, 238]. The bark is therefore anodyne, anti-inflammatory and febrifuge. It is used especially in treating rheumatism and fevers, and also to relieve the pain of menstrual cramps[238]. An infusion of the bark has been used in the treatment of whooping cough and tuberculosis[257]. A decoction of the bark has been used to rid the body of intestinal worms[257]. The bark has been eaten as a treatment for colds[257]. A tea made from the inner bark is used in the treatment of scurvy[222]. The inner bark, combined with black haw bark (Crataegus douglasii) and wild plum bark (Prunus spp) has been used as a female tonic[222, 257]. A poultice of the leaves has been used as a treatment for rheumatism, bruises, sores and boils[257].

nrakta N. America - Quebec to Florida, west to Minnesota and Texas. ksacta Rich moist soils, mainly along riverbanks, bottoms and rich woods[43, 227].

propta Seed - must be sown as soon as it is ripe in spring[113]. Poplar seed has an extremely short period of viability and needs to be sown within a few days of ripening[200]. Surface sow or just lightly cover the seed in trays in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the old frame. If sufficient growth is made, it might be pos-

swatta AntirheumaticThe fresh leaves of nettles have been rubbed or beaten onto the skin in the treatment of rheumatism etc[K]. This practice, called unctionification, causes intense irritation to the skin as it is stung by the nettles. It is believed that this treatment works in two ways. Firstly, it acts as a counter-irritant, bringing more blood to the area to help remove the toxins that cause rheumatism. Secondly, the formic acid from the nettles is believed to have a beneficial effect upon the rheumatic joints.

nrakta South-western N. America - California. ksacta Wet brushy thickets along the immediate coast[71].

propta Seed - sown spring in a cold frame, only just covering the seed. Prick out the seedlings into individual pots when they are large enough to handle, and plant them out in the summer. Division succeeds at almost any time in the growing season. Very easy, plant them straight out into their permanent positions.

nwatta We have very little information on this species and do not know if it will be hardy in Britain, though judging by its native range it should succeed outdoors in most parts of the country. It is very closely related to *U. lyallii* and is doubtfully distinct from it[71]. The Flora of North America treats this taxon as no more than a synonym of *Urtica dioica gracilis*[270]. The following notes are based on the general needs of the genus. Prefers a nitrogen-rich soil[200]. The best fibre is produced when plants are grown on deep fertile soils[200]. Dioecious. Male and female plants must be grown if seed is required. Note: *Urtica californica* Greene is a synonym of *Urtica dioica* subsp. *gracilis* (Aiton) Selandar For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

4.2.159 Hosta ventricosa

Blue plantain lily, Hosta

3 tlin 9 cyuc 2 kcaak 0 tcan 1 dwat 0.6 m hkuc pcmhminhtut cyutili tcup hwicli hrasjlutnyikfrp hpa7tli flatprikliwis hpa7tmwatli fyfxre7t hjonli

drutta Hosta ventricosa is a PERENNIAL growing to 0.6 m (2ft) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to July, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Apomictic (reproduce by seeds formed without sexual fusion). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acidic, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves StemEdible Uses: Young leaves and leaf stems - cooked. The white part of the stem is boiled[46, 61, 177].

tcanta A good ground cover plant[104], succeeding in dense shade but rather slow to spread[197]. Plants should be spaced about 60cm apart each way[208].

dwatta Odontalgic Odontalgic[74]. The root is used.

nrakta E. Asia - China. ksacta Rocky or stony river banks near ponds and lakes[74]. Forests, grassy slopes and hill-sides at elevations of 500 - 2400 metres[266].

propta Seed - sow spring in a lightly shaded position in a greenhouse and only just cover the seed. Germination usually takes place within 1 - 3 months at 10°C. Make sure you keep the compost moist. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division is possible at almost any time of the year so long as there is sufficient moisture[233]. It is best carried out in March as growth commences or in early autumn if the soil is not too dry[200]. Hostas can be left undivided for many years and should not be divided any more frequently than once every 3 - 5 years to allow the leaves to reach maturity[200].

nwatta Landscape Uses:Border, Container, Foundation, Ground cover, Seashore, Specimen. Thrives in most fertile soils if they are rich in humus[200]. Grows well in heavy clay soils and in sandy ones[208]. Very limy soils inhibit growth, but plants can thrive in such a situation if plenty of humus is added[208]. Prefers a pH between 6 and 7[200]. Requires a rich soil that does not dry out readily[11]. Succeeds in full sun as well as in deep shade, growing well in the semi-shade of a woodland[200, 233]. In general, the sunnier the position the moister the soil should be[233]. Plants are best not grown under trees in town gardens since the soot washed from the leaves of the trees in wet weather will tend to remain on the hosta[208]. Plants flower better when grown in a sunny position but the foliage is better when the plant is in a shady position[200]. Plants are in general fully hardy in Britain, but young leaves in spring can be destroyed by frost. New leaves are only produced in the spring and very early summer, so any damage at this time has a deep effect on the plant[233]. A vigorous plant, forming medium to large clumps[200]. Hybridizes freely with other members of this genus[200]. Since this species produces its seed apomictically, it should breed true[200] (unless there is also cross pollination of course). Cultivated for its root (used medicinally) in China[74]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Plants are very attractive to slugs and snails, the young shoots in spring are especially at risk[111, K]. A number of named forms have been selected for their ornamental value[187]. Special Features:Attractive foliage, Naturalizing, Suitable for cut flowers.

4.2.160 Maianthemum dilatatum

Wild Lily Of The Valley, False lily of the valley

3 tlin 7 cyuc 2 kcaak 0 tcan 1 dwat 0.2 m hkuc pcmhminhtut cyutili tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Maianthemum dilatatum is a PERENNIAL growing to 0.2 m (0ft 8in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from March to April. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acidic, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit - raw or dried for later use[118, 177]. The fruits are about the size of small peas and are produced in terminal clusters on the plants, they are not regarded very highly[256]. North American Indian children would eat the raw unripe green berries straight from the plant[256]. Adults would usually harvest the green berries and then store them in water until they turned red and were soft[256]. Alternatively they would dry the green berries and then boil them for a few minutes[256]. Young leaves - cooked[177].

dwatta Infertility Ophthalmic Poultice TBA poultice made of the whole or the mashed leaves has been applied to boils, burns, cuts and wounds[257]. The fruit has been used as a good medicine in the treatment of tuberculosis[257]. The root has been chewed in order to correct sterility[257]. (This probably means to restore fertility[K]) An infusion of the pounded roots has been used as a wash for sore eyes, whilst the chewed roots have been used as a poultice on the eyes[257].

nrakta Western N. America - California to Alaska. ksacta Shaded or moist streambanks and open to dense coniferous and broadleaved woods if they are moist[60, 270], in humus-rich slightly acidic soils[200] to 1000 metres[60].

propta Seed - best sown quite thinly it as soon as it is ripe in a cold frame, it should germinate in the spring. Stored seed should be sown in late winter in a cold frame, it might take 18 months to germinate. Allow the seedlings to grow on in the pot for their first year, giving liquid feeds as necessary to ensure that they do not go hungry. Divide the plants into individual pots once they have died down in late summer. Grow them on in pots for another year or more until large enough to plant out[K]. Division as new growth commences in the spring. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up

with underground stems sending roots and shoots along their length [1-2].

4.2.157 *Rosa virginiana*

Virginia Rose

3 tlin 7 cyuc 2 kcaak 0 tcan 1 dwat 1.5 m hkuc

hmimhtut cyutli kyuctup hwicli hrasjlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Rosa virginiana* is a deciduous Shrub growing to 1.5 m (5ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to August, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate strong winds but not maritime exposure.

pcista There is a layer of hairs around the seeds just beneath the flesh of the fruit. These hairs can cause irritation to the mouth and digestive tract if ingested.

kcakta Edible Parts: Fruit Leaves Edible Uses: Fruit - raw or cooked [177]. The fruit is up to 15mm in diameter [200], but there is only a thin layer of flesh surrounding the many seeds [K]. Some care has to be taken when eating this fruit, see the notes above on known hazards. The buds are eaten by native Indians in N. America [161, 177, 183]. No further details are given, does this refer to the leaf or flower buds? The seed is a good source of vitamin E, it can be ground into a powder and mixed with flour or added to other foods as a supplement [102, 183]. Be sure to remove the seed hairs [102].

tcanta Hedge Hedge Soil stabilization Can be grown as a hedge, succeeding in windy positions [1, 11]. The suckering form of this species can be used to fix sand dunes [11]. It also makes a good ground cover [245].

dwatta Anthelmintic Cancer Haemostatic Ophthalmica decoction of the roots has been used as a bath and to treat worms in children [257]. An infusion of the roots has been drunk and used as a wash in treating bleeding cuts on the feet [257]. An infusion of the roots has been used as a wash to treat sore eyes [257]. The fruit of many members of this genus is a very rich source of vitamins and minerals, especially in vitamins A, C and E, flavanoids and other bio-active compounds. It is also a fairly good source of essential fatty acids, which is fairly unusual for a fruit. It is being investigated as a food that is capable of reducing the incidence of cancer and also as a means of halting or reversing the growth of cancers [214].

nrakta Eastern N. America - Newfoundland to Ontario, south to Louisiana. A garden escape in Britain [17]. ksacta Damp to dry thickets, clearings, swamps and shores [43].

propta Seed. Rose seed often takes two years to germinate. This is because it may need a warm spell of weather after a cold spell in order to mature the embryo and reduce the seedcoat [80]. One possible way to reduce this time is to scarify the seed and then place it for 2 - 3 weeks in damp peat at a temperature of 27 - 32°C (by which time the seed should have imbibed). It is then kept at 3°C for the next 4 months by which time it should be starting to germinate [80]. Alternatively, it is possible that seed harvested 'green' (when it is fully developed but before it has dried on the plant) and sown immediately will germinate in the late winter. This method has not as yet (1988) been fully tested [80]. Seed sown as soon as it is ripe in a cold frame sometimes germinates in spring though it may take 18 months. Stored seed can be sown as early in the year as possible and stratified for 6 weeks at 5°C [200]. It may take 2 years to germinate [200]. Prick out the seedlings into individual pots when they are large enough to handle. Plant out in the summer if the plants are more than 25cm tall, otherwise grow on in a cold frame for the winter and plant out in late spring. Cuttings of half-ripe wood with a heel, July in a shaded frame. Overwinter the plants in the frame and plant out in late spring [78]. High percentage [78]. Cuttings of mature wood of the current seasons growth. Select pencil thick shoots in early autumn that are about 20 - 25cm long and plant them in a sheltered position outdoors or in a cold frame [78, 200]. The cuttings can take 12 months to establish but a high percentage of them normally succeed [78].

Division of suckers in the dormant season. Plant them out direct into their permanent positions. Layering. Takes 12 months [11].

nwatta Succeeds in most soils, preferring one on the dryish side [11]. Grows well in heavy clay soils. Prefers a circumneutral soil and a sunny position [200]. Dislikes water-logged soils. Does well in a windy position [11]. Grows well with alliums, parsley, mignonette and lupins [18, 20]. Garlic planted nearby can help protect the plant from disease and insect predation [18, 20]. Grows badly with boxwood [18]. The flowers are fragrant [245]. The form in cultivation in Britain is very invasive, forming thickets with its suckers, whilst the wild form does not produce suckers [11]. Hybridizes freely with other members of this genus [80]. Plants in this genus are notably susceptible to honey fungus [200].

4.2.158 *Urtica californica*

Stinging Nettle, California nettle

3 tlin 10 cyuc 2 kcaak 4 tcan 2 dwat 1.8 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli nyanhjen hjonli

drutta *Urtica californica* is a PERENNIAL growing to 1.8 m (6ft). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

pcista The leaves of the plants have stinging hairs, causing irritation to the skin [21, 200]. This action is neutralized by heat so the cooked leaves are perfectly safe and nutritious [200]. However, only young leaves should be used because older leaves develop gritty particles called cystoliths which act as an irritant to the kidneys [172].

kcakta Edible Parts: Leaves Edible Uses: Drink Young leaves - cooked [172]. A very nutritious food, high in vitamins and minerals, it makes an excellent spinach substitute and can also be added to soups and stews. Only use the young leaves and wear stout gloves when harvesting them to prevent getting stung. Although the fresh leaves have stinging hairs, thoroughly drying or cooking them destroys these hairs. Nettle beer is brewed from the young shoots [200].

tcanta Compost Dye Fibre Hair Liquid feed Repellent A strong flax-like fibre is obtained from the stems [200]. Used for making string and cloth, it also makes a good quality paper [115]. It is harvested as the plant begins to die down in early autumn and is retted before the fibres are extracted [4, 99]. The following uses have been listed for *U. dioica*, but they are almost certainly also applicable to this species. The plant matter left over after the fibres have been extracted are a good source of biomass and have been used in the manufacture of sugar, starch, protein and ethyl alcohol [4]. An oil obtained from the seeds is used as an illuminant [4]. An essential ingredient of 'OR' herbal compost activator [32]. This is a dried and powdered mixture of several herbs that can be added to a compost heap in order to speed up bacterial activity and thus shorten the time needed to make the compost [K]. The leaves are also an excellent addition to the compost heap [12, 18, 20] and they can be soaked for 7 - 21 days in water to make a very nutritious liquid feed for plants [54]. This liquid feed is both insect repellent and a good foliar feed [14, 18, 53]. The growing plant increases the essential oil content of other nearby plants, thus making them more resistant to insect pests [18, 20, 54]. Although many different species of insects feed on nettles, flies are repelled by the plant so a bunch of freshly cut stems has been used as a repellent in food cupboard [4]. The juice of the plant, or a decoction formed by boiling the herb in a strong solution of salt, will curdle milks and thus acts as a rennet substitute [4]. This same juice, if rubbed into small seams of leaky wooden tubs, will coagulate and make the tub watertight again [4]. A hair wash is made from the infused leaves and this is used as a tonic and antidandruff treatment [172, 201]. A beautiful and permanent green dye is obtained from a decoction of the leaves and stems [4, 115]. A yellow dye is obtained from the root when boiled with alum [4, 115].

sible to plant them out in late summer into their permanent positions, otherwise keep them in the cold frame until the following late spring and then plant them out. Most poplar species hybridize freely with each other, so the seed may not come true unless it is collected from the wild in areas with no other poplar species growing [11]. Cuttings of mature wood of the current season's growth, 20 - 40cm long, November/December in a sheltered outdoor bed or direct into their permanent positions. Very easy. Suckers in early spring [78].

nwatta Industrial Crop: Biomass Management: Coppice Management: Standard Minor Global Crop Other Systems: Irreg. Intercrop Other Systems: Strip intercrop Landscape Uses: Erosion control, Aggressive surface roots possible. An easily grown plant, it does well in a heavy cold damp soil [1, 269] but thrives best on moist well-drained, fine sandy loams or silts close to streams [269]. Prefers a deep rich well-drained circumneutral soil, growing best in the south and east of Britain [11, 200]. Growth is much less on wet soils, on poor acid soils and on thin dry soils [11]. It does not do well in exposed upland sites [11]. It dislikes shade and is intolerant of root or branch competition [200]. Tolerates both hot and cool summers [200]. Fairly wind-tolerant [200]. The tree is reported to tolerate an annual precipitation in the range of 60 to 150cm, an annual temperature in the range of 8 to 14°C, and a pH of 4.5 to 8 [269]. A fast-growing but short-lived tree [227, 229, 274]. It can make new shoots up to 1.5 metres long each year [274] and is often planted for timber in Europe [50]. It does have drawbacks, though, since it is easily storm-damaged, is easily damaged by fire when young and is much attacked by fungi [227]. Like the quaking aspen (*Populus tremuloides*) the leaves of this species rustle even in light breezes [274]. The trees can be coppiced [149], sprouting freely from the base of the trunk and the roots if they are cut down [227]. Poplars have very extensive and aggressive root systems that can invade and damage drainage systems. Especially when grown on clay soils, they should not be planted within 12 metres of buildings since the root system can damage the building's foundations by drying out the soil [11]. Dioecious. Male and female plants must be grown if seed is required. Hybridizes freely with other members of this genus [200]. Special Features: North American native, Naturalizing, Wetlands plant, Inconspicuous flowers or blooms.

4.2.107 *Ulmus americana*

American Elm, Gray Elm, Water Elm

3 tlin 9 cyuc 2 kcaak 0 tcan 2 dwat 25 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Ulmus americana* is a deciduous Tree growing to 25 m (82ft) by 25 m (82ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower in May, and the seeds ripen in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves Edible Uses: Coffee Leaves - raw or cooked. The red inner bark has been used to make a coffee-like drink [257].

tcanta Containers Paper String Wood A fibre obtained from the stems is used in making paper [189]. The stems are harvested in spring, the leaves are removed and the stems steamed until the fibres can be stripped. The outer bark is removed from the inner bark by scraping or peeling. The fibres are cooked for 2 hours with lye and then beaten with mallets. The paper is beige in colour [189]. The inner bark is very fibrous and is used in making string and strong ropes [149, 226]. The bark has been used to make various containers, including those used for gathering maple syrup [226]. Wood - hard, strong, heavy, durable, coarse grained, shrinks moderately though it tends to warp and twist, it bends well and is difficult to split. The wood is very durable in water. It weighs 40lb per cubic foot and is harvested commercially for flooring, wheel hubs, cooperage, agricultural implements and many other uses [46, 61, 82, 149, 171, 226, 227].

dwatta Antispasmodic Astringent Birthing aid Dysentery Haemostatic Salve An infusion made from the bark has

been used in the treatment of bleeding from the lungs, ruptures, coughs, colds, influenza, dysentery, eye infections, cramps and diarrhoea [226, 257]. An infusion of the bark has been taken by pregnant women to secure stability of children [257]. A decoction of the bark has been used as a wash on wounds [257]. A decoction of the inner bark has been taken in the treatment of severe coughs, colds, menstrual cramps [257]. An infusion of the inner bark has been drunk, and used as a bath, in the treatment of appendicitis [257]. An infusion of the root bark has been used in the treatment of coughs, colds and excessive menstruation [257]. A decoction has been used as an eye wash in the treatment of sore eyes [257]. The inner bark has been used as an emollient on tumours [257].

nrakta Eastern N. America - Newfoundland to Manitoba, Florida and Texas. ksacta Rich soils, especially by streams and in lowlands [43, 82]. Found on a range of soil types, from acidic to mildly alkaline [229].

propta Seed - if sown in a cold frame as soon as it is ripe, it usually germinates within a few days [200]. Stored seed does not germinate so well and should be sown in early spring [200]. The seed can also be harvested 'green' (when it has fully developed but before it dries on the tree) and sown immediately in a cold frame. It should germinate very quickly and will produce a larger plant by the end of the growing season [80]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Plants should not be allowed to grow for more than two years in a nursery bed since they form a tap root and will then move badly. Layering of suckers or coppiced shoots [200].

nwatta Landscape Uses: Firewood, Aggressive surface roots possible, Specimen, Street tree. Prefers a fertile soil in full sun [188], but it can be grown in any soil of at least moderate quality so long as it is well drained [1]. Trees are moderately fast-growing and live for at least 300 years in the wild [227, 229], but they do not thrive in Britain [1]. This species is particularly susceptible to 'Dutch elm disease' [274], a disease that has destroyed the greater part of all the elm trees growing in Britain. The disease is spread by means of beetles. Mature trees killed back by the disease will often regrow from suckers, but these too will succumb when they get larger. There is no effective cure (1992) for the problem, but most E. Asian, though not Himalayan, species are resistant (though not immune) to the disease so the potential exists to use these resistant species to develop new resistant hybrids with the native species [200]. The various species of this genus hybridize freely with each other and pollen is easily saved, so even those species with different flowering times can be hybridized [200]. Special Features: North American native, Inconspicuous flowers or blooms.

4.2.108 *Acer platanoides*

Norway Maple, Harlequin Maple

3 tlin 7 cyuc 2 kcaak 3 tcan 0 dwat 21 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli hjonli

drutta *Acer platanoides* is a deciduous Tree growing to 21 m (69ft) by 15 m (49ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from April to May, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: Sap Edible Uses: Sweetener The sap contains a certain amount of sugar and can either be used as a drink, or can be concentrated into a syrup by boiling off the water [4, 105, 177]. The syrup is used as a sweetener on many foods. The concentration of sugar is considerably lower than in the sugar maples (*A. saccharum*) [2]. The tree trunk is tapped in the early spring, the sap flowing better on

warm sunny days following a frost. The best sap production comes from cold-winter areas with continental climates.

tcanta Dye Preservative Shelterbelt WoodThe leaves are packed around apples, rootcrops etc to help preserve them[18, 20]. The trees are fairly wind tolerant and are often used in to give protection from the wind in mixed shelterbelts[200]. They are fast-growing and rapidly produce a screen[200]. A rose coloured dye is obtained from the bark[57]. Wood - hard, heavy, fine grained. Used for small domestic items[4, 13, 46, 61].

nrakta Europe, from Scandinavia to the Urals and the Mediterranean, east to W.Asia. Naturalized in Britain. ksacta Grows on all but very poor soils in Britain[17].

propta Seed - best sown as soon as it is ripe in a cold frame, it usually germinates in the following spring. Pre-soak stored seed for 24 hours and then stratify for 2 - 4 months at 1 - 8°C. It can be slow to germinate. The seed can be harvested 'green' (when it has fully developed but before it has dried and produced any germination inhibitors) and sown immediately. It should germinate in late winter. If the seed is harvested too soon it will produce very weak plants or no plants at all[80, 113]. When large enough to handle, prick the seedlings out into individual pots and grow them on until they are 20cm or more tall before planting them out in their permanent positions. Layering, which takes about 12 months, is successful with most species in this genus. Cuttings of young shoots in June or July. The cuttings should have 2 - 3 pairs of leaves, plus one pair of buds at the base. Remove a very thin slice of bark at the base of the cutting, rooting is improved if a rooting hormone is used. The rooted cuttings must show new growth during the summer before being potted up otherwise they are unlikely to survive the winter. Cultivars can be budded onto rootstocks of the species. Any grafting is best carried out in September rather than February.

nwatta Landscape Uses:Firewood, Aggressive surface roots possible, Pollard, Screen. Of easy cultivation, it prefers a good moist well-drained soil but thrives in any soil[11, 17]. Grows well in heavy clay soils. Prefers a sunny position but tolerates some shade[11, 200]. One report says that plants tolerate chalky soils[200], but another says that plants can develop chlorosis as a result of iron deficiency when they are grown in alkaline soils. Trees are very tolerant of atmospheric pollution[226]. The Norway maple is a quick-growing tree that has been widely planted in Britain and is more or less naturalized. There are many named forms that have been selected for their ornamental value[11]. Norway maple is a bad companion plant, inhibiting the growth of nearby plants[18, 20]. The leaves are seldom eaten or defaced by insects because the tree contains a sharp milky juice that they dislike[4]. Trees take 30 years to produce seed[98]. **Special Features:** Not North American native, Invasive, Naturalizing, Attractive flowers or blooms.

4.2.109 *Ulmus rubra*

Slippery Elm

3 tlin 7 cyuc 2 kcaak 3 tcan 5 dwat 20 m hkuc hmimhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Ulmus rubra* is a deciduous Tree growing to 20 m (65ft) by 15 m (49ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from March to May, and the seeds ripen from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Outer bark constituents known to cause abortions - avoid during pregnancy [301].

kcakta Edible Parts: Fruit Inner bark LeavesEdible Uses: TeaLeaves - raw or cooked. Inner bark - raw or cooked. It can be dried, ground into a powder and then used as a thickener in soups or added to cereal flours when making bread etc[2, 14, 46, 55, 171]. It can also be chewed as a thirst quencher[227]. The inner bark has been cooked with fats in order to prevent them becoming rancid[257]. Immature fruit - raw or cooked[177]. The fruit is about 20mm in diameter[200]. A tea-like beverage can be brewed from the inner bark[257].

tcanta Fibre Kindling Roofing Tinder WoodA fibre obtained from the inner bark is used to make a twine[189, 257]. The boiled bark has been used for making matting, nets etc[257]. The inner bark has been used in making baskets[257]. The bark has been used as a roofing material[257]. The weathered bark has been used as kindling for starting a fire[257]. Wood - very close-grained, tough, heavy, hard, strong, durable, easy to split. It weighs 43lb per cubic foot and is used for fence posts, window sills, agricultural implements etc[46, 61, 82, 227].

dwatta Demulcent Diuretic Emollient Expectorant Nutritive UrinarySlippery elm bark is a widely used herbal remedy and is considered to be one of the most valuable of remedies in herbal practice[4]. In particular, it is a gentle and effective remedy for irritated states of the mucous membranes of the chest, urinary tubules, stomach and intestines[254]. The inner bark contains large quantities of a sticky slime that can be dried to a powder or made into a liquid[229]. The inner bark is harvested in the spring from the main trunk and from larger branches, it is then dried and powdered for use as required[4]. Ten year old bark is said to be best[4]. Fine grades of the powder are best for internal use, coarse grades are better suited to poultices[238]. The plant is also part of a North American formula called *essiac* which is a popular treatment for cancer. Its effectiveness has never been reliably proven or disproven since controlled studies have not been carried out. The other herbs included in the formula are *Arctium lappa*, *Rumex acetosella* and *Rheum palmatum*[254]. The inner bark is demulcent, diuretic, emollient, expectorant, nutritive[4, 21, 165, 213]. It has a soothing and healing effect on all parts of the body that it comes into contact with[4] and is used in the treatment of sore throats, indigestion, digestive irritation, stomach ulcers etc[222]. It used to be frequently used as a food that was a nutritive tonic for the old, young and convalescents[222]. It was also applied externally to fresh wounds, burns and scalds[222]. The bark has been used as an antioxidant to prevent fats going rancid[222]. The whole bark, including the outer bark, has been used as a mechanical irritant to abort foetuses[238]. Its use became so widespread that it is now banned in several countries[238].

nrakta Central and Southern N. America - Maine to Florida, west to Texas and North Dakota. ksacta Rich deep soils, often calcareous, on the banks of streams and low rocky hillsides[43, 82].

propta Seed - if sown in a cold frame as soon as it is ripe, it usually germinates within a few days[200]. Stored seed does not germinate so well and should be sown in early spring[200], it requires 2 - 3 months stratification according to another report[113]. The seed can also be harvested 'green' (when it has fully developed but before it dries on the tree) and sown immediately in a cold frame. It should germinate very quickly and will produce a larger plant by the end of the growing season[80]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Plants should not be allowed to grow for more than two years in a nursery bed since they form a tap root and will then move badly. Layering of suckers or coppiced shoots[200].

nwatta Industrial Crop: Medicinal Management: Cop-pice Management: Standard Minor Global CropPrefers a fertile soil in full sun[188], but can be grown in any soil of at least moderate quality so long as it is well drained[1]. Plants are hardy to about -10°C[238]. A moderately fast-growing tree, living about 200 years in the wild[229], but although perfectly hardy, this species does not usually thrive in Britain[11]. Trees are often harvested in the wild for their edible inner bark, the 'slippery elm' that can be obtained from chemists and health food shops[K]. Trees have been over-exploited in the wild, plus they have also suffered from Dutch elm disease. As a result they are becoming much less common[238]. The slippery elm is very susceptible to 'Dutch elm disease', a disease that has destroyed the greater part of all the elm trees growing in Britain. The disease is spread by means of beetles. There is no effective cure (1992) for the problem, but most E. Asian, though not Himalayan, species are resistant (though not immune) to the disease so the potential exists to use these resistant species to develop new resistant hybrids with the native species[200]. The various species of this genus hybridize freely with each other and

nwatta Succeeds in most good garden soils[1], preferring one that is well-drained and moisture retentive[200]. Prefers a sunny position[200]. Succeeds in dry soils in the shade[200]. Grows well in light woodland shade[88], succeeding amongst the roots of other plants[233]. Plants are hardy to about -25°C[187]. The plant has an invasive root system and can spread freely when well sited[233]. Slugs are fond of this plant and have destroyed even quite large clumps by eating out all the new growth in spring[K]. Most species in this genus seem to be immune to the predations of rabbits[233]. A very variable plant with many different forms[187], it hybridizes freely with other members of this genus[200].

4.2.155 *Bupleurum chinense*

Bei Chai Hu

3 tlin 7 cyuc 2 kcaak 0 tcan 3 dwat 1 m hkuc hmimhtut cyutli kyucctcup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli fyfjxre7t hjonli

drutta *Bupleurum chinense* is a PERENNIAL growing to 1 m (3ft 3in) by 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to October, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Leaves RootEdible Uses: Rutin-Leaves and young shoots - cooked[2, 105, 177].The new growth in spring and autumn is used[178, 179]. It is a good source of rutin[179]. Root - cooked. A famine food, used when all else fails[177, 179].

tcanta FuelThe old plant is used as a fuel[178, 179].

dwatta Alternative Analgesic Antibacterial Antinflammatory Antiperiodic Antipyretic Antiviral Carminative Diaphoretic Emmenagogue Haemolytic Malaria Pectoral SedativeBei chai hu root has been used in traditional Chinese medicine for at least 2,000 years[238]. It is a bitter herb that is used to harmonize the body, balancing the different organs and energies within the body[254]. It strengthens the digestive tract, acts as a tonic for the liver and circulatory system, lowers fevers and has anti-viral effects[238]. The root is alternative, analgesic, antibacterial, anti-inflammatory, antiperiodic, antipyretic, antiviral, carminative, diaphoretic, emmenagogue, haemolytic, hepatic, pectoral, sedative[116, 147, 174, 176, 178, 218, 238, 254]. It is taken internally in the treatment of malaria, blackwater fever, uterine and rectal prolapse, haemorrhoids, sluggish liver, menstrual disorders, abdominal bloating etc[238]. The roots are harvested in the autumn and can be used fresh or dried[238]. The root contains saikosides[254]. These saponin-like substances have been shown to protect the liver from toxicity whilst also strengthening its function, even in people with immune system disorders[254]. These saikosides also stimulate the body's production of corticosteroids and increase their anti-inflammatory affect[254]. The plant is often used in preparations with other herbs to treat the side effects of steroids[218].

nrakta E. Asia - China, Korea. ksacta Grassy areas on hills and mountain slopes in Korea[279]. Grasslands, stream banks, sunny slopes and roadsides at elevations of 100 - 2700 metres in China[266].

propta Seed - sow spring in a cold frame. The seed usually germinates in 2 - 8 weeks at 15°C[138]. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer or following spring. Division in spring. Very easy, larger clumps can be planted direct into their permanent positions. It is best to pot up smaller clumps and grow them on in a cold frame until they are well rooted before planting them out in the summer.

nwatta An easily cultivated plant[1], it succeeds in a sunny position in most fertile well-drained soils[138, 233, 238]. This species is closely related to *B. falcatum*, and is included in that species by some botanists.

4.2.156 *Polygonatum biflorum*

Small Solomon's Seal

3 tlin 7 cyuc 2 kcaak 2 tcan 1 dwat 1 m hkuc pcmimhm cyutli tcup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli fyfjxre7t hjonli

drutta *Polygonatum biflorum* is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

pcista The fruit and seed are possibly poisonous[65]. **kcakta** Edible Parts: Leaves RootEdible Uses: Young shoots - raw or cooked[159, 177]. An excellent vegetable when boiled and used as an asparagus substitute[183]. Root - cooked[61]. The flavour is somewhat bitter, to counteract this the root is sliced crosswise, cooked in alkaline water and the water changed during the cooking process[183]. When steamed and sun-dried nine times the root is delicious[179]. The roots are rich in starch, this can be extracted by beating or grinding the dried root, the starch can then be used to make bread or can be mixed in other foods such as soups[159, 183, 257].

tcanta IncenseThe root has been burnt as an incense[257]. It is said that when the root is burnt in the bedroom just before going to sleep, the person would sleep soundly and awaken refreshed, rested and feeling young[257].

dwatta Laxative Poulitce SedativeA tea made from the roots is laxative[222]. It has been used in the treatment of indigestion, profuse menstruation, lung ailments, general debility etc[222]. It is a folk remedy for piles, rheumatism and skin irritations[222]. A poultice or decoction of the fresh roots is applied to cuts, bruises, sores etc[222, 257].

nrakta N. America - New Brunswick to Michigan, south to Tennessee and Florida ksacta Dry to moist sandy, loamy or rocky deciduous woods and thickets, usually in upland areas[43].

propta Seed - best sown as soon as it is ripe in early autumn in a shady part of a cold greenhouse[200]. Sow stored seed as early in the year as possible. Germination can be slow, they may not come true to type[200] and it takes a few years for them to reach a good size. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a shady position in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in March or October. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Prefers a fertile humus rich moisture-retentive well-drained soil in cool shade or semi-shade[200]. Plants are intolerant of heat and drought but they tolerate most other conditions[200]. A very ornamental plant, it grows well in woodland and copses[1, 42]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. The young shoots are very attractive to slugs[K]. Hybridizes with other members of this genus[200]. *Polygonatum biflorum* var. *commutatum* (Schult. and Schult.f.) Morong is a synonym of *Polygonatum biflorum* (Walter) Elliott The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous

haemolytic, hepatic, pectoral, sedative[116, 147, 174, 176, 178, 218, 238, 254]. It is taken internally in the treatment of malaria, blackwater fever, uterine and rectal prolapse, haemorrhoids, sluggish liver, menstrual disorders, abdominal bloating etc[238]. The roots are harvested in the autumn and can be used fresh or dried[238]. The root contains saikosides[254]. These saponin-like substances have been shown to protect the liver from toxicity whilst also strengthening its function, even in people with immune system disorders[254]. These saikosides also stimulate the body's production of corticosteroids and increase their anti-inflammatory affect[254]. The plant is often used in preparations with other herbs to treat the side effects of steroids[218].

nrakta Scattered throughout Europe, including Britain, and Asia north to the subarctic, east to Japan. ksacta Waste places and hedgebanks[17].

propta Seed - sow spring in a cold frame. The seed usually germinates in 2 - 8 weeks at 15°C[138]. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer or following spring. Division in spring. Very easy, larger clumps can be planted direct into their permanent positions. It is best to pot up smaller clumps and grow them on in a cold frame until they are well rooted before planting them out in the summer.

nwatta An easily cultivated plant[1], it succeeds in a sunny position in most fertile well-drained soils[138, 233, 238].

4.2.153 Galium aparine

Goosegrass, Coachweed, Catchweed, Stickywilly
3 tlin 7 cyuc 2 kcaak 3 tcan 3 dwat 1.2 m hkuc
pcimhmihntu cyutli kyucucup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta Galium aparine is a ANNUAL growing to 1.2 m (4ft) by 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from June to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies, beetles. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista The sap of the plant can cause contact dermatitis in sensitive people[222]. Can cause severe skin irritation [301].

kcakta Edible Parts: LeavesEdible Uses: Coffee TeaThe tender young shoot tips - raw or cooked as a pot-herb[5, 7, 53, 55, 62, 172, 183]. A rather bitter flavour that some people find unpalatable[244], they are best used in the spring[178]. They make a useful addition to vegetable soups[7, 244]. It is said that using this plant as a vegetable has a slimming effect on the body[238]. The roasted seed is a coffee substitute[2, 53, 62]. One of the best substitutes, it merely needs to be dried and lightly roasted and has much the flavour of coffee[4, 115, 183]. A decoction of the whole dried plant gives a drink equal to tea[2, 4].

tcanta Cleanser Dye Filter TinderA red dye is obtained from a decoction of the root[4, 7, 168]. When ingested it can dye the bones red[4]. The dried plant is used as a tinder[99]. The plant can be rubbed on the hands to remove pitch (tar)[99]. The stems are placed in a layer 8cm or more thick and then used as a sieve for filtering liquids[4, 115, 172].

dwatta Alternative Antiphlogistic Aperient Astringent Cancer Depurative Diaphoretic Diuretic Eczema Febrifuge Homeopathy Skin Tonic VulneraryGoosegrass has a long history of domestic medicinal use and is also used widely by modern herbalists. A valuable diuretic, it is often taken to treat skin problems such as seborrhoea, eczema and psoriasis, and as a general detoxifying agent in serious illnesses such as cancer[254]. The whole plant, excluding the root, is alterative, antiphlogistic, aperient, astringent, depurative, diaphoretic, diuretic, febrifuge, tonic and vulnerary[4, 7, 9, 21, 165, 218, 222]. It is harvested in May and June as it comes into flower and can be used fresh or dried for later use[4, 238]. It is used both internally and externally in the treatment of a wide range of ailments, including as a poultice for wounds, ulcers and many other skin problems[4, 7, 244],

and as a decoction for insomnia and cases where a strong diuretic is beneficial[4]. It has been shown of benefit in the treatment of glandular fever, ME, tonsillitis, hepatitis, cystitis etc[238]. The plant is often used as part of a spring tonic drink with other herbs[4]. A tea made from the plant has traditionally been used internally and externally in the treatment of cancer[4, 218, 222]. One report says that it is better to use a juice of the plant rather than a tea[254]. The effectiveness of this treatment has never been proved or disproved[7]. Both Asperuloside (a terpenoid) and Coumarin (a benzopyrone) occur in some species of Galium. Asperuloside can be converted into prostaglandins (hormone-like compounds that stimulate the uterus and affect blood vessels), making the genus of great interest to the pharmaceutical industry[238]. A homeopathic remedy has been made from the plant[7].

nrakta Europe, including Britain, from Scandinavia south and east to Spain, N. and W. Asia. ksacta Hedgerows and as a weed of cultivated land[7]. Moist and grassy places on most types of soil[17].

propta Seed - best sown in situ as soon as the seed is ripe in late summer[200]. The seed can also be sown in spring though it may be very slow to germinate[200]. Once established, this plant does not really need any help to reproduce itself.

nwatta Prefers a loose moist leafy soil in some shade[200]. Plants tolerate dry soils, but they quickly become scorched when growing in full sun[200]. They do not thrive in a hot climate[200]. Another report says that plants succeed in most soils in full sun or heavy shade. A scrambling plant, the stems and leaves are covered with little hooked bristles by which it can adhere to other plants and climb into them[4]. A good species to grow in the wild garden, it provides food for the larvae of many butterfly species[30].

4.2.154 Aster macrophyllus

Bigleaf Aster
3 tlin 7 cyuc 2 kcaak 2 tcan 1 dwat m hkuc
hmimhntu cyutli kyucucup hwicli hrasjlutnyik hpa7tli flat-prikliwis hpa7tmwatli fyifxre7t hjonli

drutta Aster macrophyllus is a PERENNIAL growing to 0.6 m (2ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Leaves RootEdible Uses: Very young leaves - cooked and used as a vegetable[46, 61, 105, 161, 177]. The leaves are said to act as a medicine as well as a food, though no details are given[257]. Only young leaves are eaten as old leaves quickly become tough[213]. Roots - cooked. They have been used in soups[257].

tcanta Plants can be used as a ground cover in light shade, forming a spreading clump[208, 233].

dwatta Blood purifier Laxative VDThe roots have been used as a blood medicine[257]. An infusion of the root has been used to bathe the head to treat headaches[257]. A compound decoction of the roots has been used as a laxative in the treatment of venereal disease[257].

nrakta Eastern N. America. Occasionally naturalized in Britain[17]. ksacta Dry to moist open woods, thickets and clearings[43]. By rivers and streams in Britain[17].

propta Seed - surface sow in spring in a cold frame. Do not allow the compost to become dry. Pre-chilling the seed for two weeks can improve germination rates[134]. Germination usually takes place within 2 weeks at 20°C[134]. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn[200]. Very easy, larger divisions can be planted straight into their permanent positions whilst smaller clumps are best potted up and kept in a cold frame until they are growing away well. Basal cuttings in late spring. Harvest the shoots when they are about 10 - 15cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

pollen is easily saved, so even those species with different flowering times can be hybridized[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2].

4.2.110 Betula platyphylla

White Birch, Asian white birch,
3 tlin 6 cyuc 2 kcaak 2 tcan 2 dwat 20 m hkuc
htut cyutli kyucucup hwicli hyshrasjlutnyikfrip hpa7tli flat-prikliwis hpa7tmwatli hjonli

drutta Betula platyphylla is a deciduous Tree growing to 20 m (65ft 7in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to May, and the seeds ripen in September. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate strong winds but not maritime exposure.

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

kcakta Edible Parts: Inner bark SapEdible Uses: Inner bark - cooked. Rich in starch[177]. It can be dried and ground into a meal and used as a thickener in soups etc or mixed with flour for making bread, biscuits etc. Inner bark is generally only seen as a famine food, used when other forms of starch are not available or are in short supply[K]. Sap. Used for making a vinegar[177].

tcanta Dynamic accumulator.

dwatta Antifungal Antiinflammatory Antiseborrheic Cancer Tonic UrinaryThe bark of the sub-species Betula platyphylla japonica is often used medicinally in Korea. It contains several medically active constituents including triterpenoids and flavonoids and is antifungal, anti-inflammatory and tonic[279]. It is used in the treatment of conditions such as internal diseases and inflammation[279]. The root bark, and other parts of the plant, show anticancer activity[218]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Betula species for infections of the urinary tract, kidney and bladder stones, rheumatism (see [302] for critics of commission E).

nrakta E. Asia - northern China, Japan, Korea, Siberia. ksacta Highlands, C. and N. Japan[58].

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

nwatta Landscape Uses:Specimen. Succeeds in a well-drained loamy soil in a sunny position[11, 200]. Tolerates most soils including poor soils and heavy clays[200]. Fairly wind tolerant[200]. A fast-growing but short-lived tree[200]. Hybridizes freely with other members of this genus[50]. This species is closely related to B. pendula[11]. A good plant to grow near the compost heap, aiding the fermentation process[20]. Trees are notably susceptible to honey fungus[200]. Special Features: Not North American native, Inconspicuous flowers or blooms.

4.2.111 Juniperus virginiana

Pencil Cedar, Eastern redcedar, Southern redcedar, Silver Cedar, Burk Eastern Red Cedar, Silver East
3 tlin 9 cyuc 2 kcaak 4 tcan 2 dwat 20 m hkuc
htut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatprikli-wisslip hpa7tmwatli nyanhjen hjonli

drutta Juniperus virginiana is an evergreen Tree growing to 20 m (65ft) by 8 m (26ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in leaf all year, in flower from April to May, and the seeds ripen in October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure.

pcista All parts of the plant might be toxic[4, 222]. kcakta Edible Parts: FruitEdible Uses: TeaFruit - raw or cooked[106]. A sweetish resinous flesh[82]. The bark can be crushed and used as a flavouring in soups and stews[257]. The cones are about 5mm in diameter[200]. About 10mm according to another report[226]. A tea is made from the fruit[159]. It is not very nice[159]. It is made from the young branchlets and the fruit according to one report[183].

tcanta Essential Insecticide Repellent Shelterbelt Tinder WoodAn essential oil is obtained from the wood[1, 46, 57, 61]. Composed of cedar camphor or cedrol[213], it is used in soaps, as an insecticide and moth repellent[61, 213], a deodorant, in polishes, perfumery etc[4, 21]. Chips of the wood have been used as moth repellents[269]. The leaves are used as an incense[46, 213] and are also either burnt or crushed and then scattered around as an insect repellent[169, 257]. The crushed bark can be used as a soft base in cradles[257]. The bark has also been cut into strips and used to make mats[257, 269]. The red inner bark is a source of a red dye[269]. The bark of the tree is useful as tinder in starting fires Boy Scout style[269]. Some cultivars of this tree are suitable for ground cover when spaced about 90cm apart each way[208]. 'Tripartista' and 'Chamberlainii' have been recommended[208]. A fairly wind resistant tree, it can be grown as part of a shelterbelt planting[200]. Wood - very durable, light, brittle, soft, easily worked, very fragrant, insect-resistant[1, 46, 82, 171, 227]. The wood does not shrink much on drying and weighs 30lb per cubic foot[227]. The reddish wood is highly prized for cabinet making[226], it is also used for fencing, the casing of lead pencils etc[1, 46, 82, 171].

dwatta Abortifacient Anthelmintic Antiseptic Aromatherapy Cancer Diaphoretic Diuretic Emmenagogue Rubefacient StimulantPencil cedar leaves were much used medicinally by the native N. American Indians, and also in folk medicine by the white settlers, especially to treat chest complaints and skin problems such as venereal warts and other excrescences[269]. The leaves are anthelmintic, diuretic, rubefacient and stimulant[4, 257]. A decoction has been used in the treatment of coughs and colds, general weakness and as a medicine for convalescents[257]. The berries are anthelmintic, diaphoretic, emmenagogue and mildly antiseptic[4, 213, 222, 257]. They have been chewed as a treatment for mouth ulcers[213, 257] or made into a tea to treat colds, rheumatism, worms etc[222, 257]. The fresh young twigs are used as a diuretic[213]. An infusion has been used both internally and as a steam bath in the treatment of rheumatism[257]. The essential oil from the wood is an abortifacient, in some cases it has caused vomiting, convulsions, coma and death[4, 213]. The plant is said to contain the anticancer compound podophylotoxin[222]. The essential oil from the berries is used in aromatherapy. Its keyword is 'Composing'[210].

nrakta Central and Eastern N. America from Canada south to Georgia and Texas. ksacta Dry, rarely wet, open woods and rock slopes, often on limestone[43]. Infertile soils and old pastures[222].

propta The seed requires a period of cold stratification. The seed has a hard seedcoat and can be very slow to germinate, requiring a cold period followed by a warm period and then another cold spell, each of 2 - 3 months duration[78,

81]. Soaking the seed for 3 - 6 seconds in boiling water may speed up the germination process[11]. The seed is best sown as soon as it is ripe in a cold frame. Some might germinate in the following spring, though most will take another year. Another possibility is to harvest the seed 'green' (when the embryo has fully formed but before the seedcoat has hardened). The seedlings can be potted up into individual pots when they are large enough to handle. Grow on in pots until large enough, then plant out in early summer. When stored dry, the seed can remain viable for several years[1]. Cuttings of mature wood, 5 - 10cm with a heel, September/October in a cold frame. Plant out in the following autumn[1, 78]. Layering in September/October. Takes 12 months[78].

nwatta Landscape Uses:Christmas tree, Firewood, Screen, Seashore, Specimen, Street tree. Succeeds in most soils if they are well drained, preferring a neutral or slightly alkaline soil[1, 11] and succeeding on chalk[200]. Established plants are drought tolerant, succeeding in hot dry positions[200]. They are also fairly wind-resistant[200]. A very ornamental and hardy plant[1]. It is very slow growing[4] and apparently short-lived in Britain[185], though it is very long-lived in its native environment[226]. Another report says that plants live to a moderate age of 200 - 350 years in the wild[229]. Cultivated as a timber tree in some parts of C. and S. Europe[50] and used as a Christmas tree in parts of N. America[269], there are some named forms, selected for their ornamental value[200]. Closely related to *J. scopulorum*, it hybridizes with that species where their ranges overlap[226]. The main difference between the two species is that the fruits of this plant mature in one year whilst those of *J. scopulorum* take two years[226]. This species often hybridizes with other members of the genus. The crushed foliage has an aroma like soap or paint[185]. Plants are resistant to honey fungus[88]. In America this tree is a host of a gall-like rust that at certain stages in its life-cycle also attacks the leaves of apple trees[149]. Plants are usually dioecious, though trees with both male and female flowers are occasionally found[229]. Male and female plants must usually be grown if seed is required. Special Features: Attracts birds, North American native, Fragrant foliage, Attracts butterflies, Attractive flowers or blooms. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is flat with shallow roots spreading near the soil surface [1-2].

4.2.112 Thuja occidentalis

American Arbor-Vitae, Arborvitae, Eastern Arborvitae, Siberian Arborvitae, Northern White Cedar, Wx 3 tin 7 cyuc 2 kcaak 0 tcan 3 dwat 15 m hkuc hmimhtut cyuti tcuphja7n hwicli hrasjlutnykfrip hpa7tli flat-priklwisslip hpa7tmwattli hjoni

drutta Thuja occidentalis is an evergreen Tree growing to 15 m (49ft) by 5 m (16ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 2. It is in leaf all year, in flower from April to May, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

pcista An essential oil from the leaves is poisonous if taken in large doses[7, 65]. Nausea, vomiting, flatulence, indigestion reported. Possible asthma and seizures [301]. This plant should not be used by pregnant women[165]. Use oil internally in small quantities and under medical supervision. Death and convulsions reported with improper internal use [301].

kcakta Edible Parts: StemEdible Uses: TeaPith of young shoots - cooked[105]. It can be added to soups[177]. Pleasantly sweet, the pith was used as the basis of the soup according to one report[183]. Inner bark - cooked. It is only used in times of emergency or scarcity[213]. The inner bark can be dried and ground into a powder, then used with wheat or other cereals in making bread, biscuits etc. The leafy branchlets are used as a tea substitute[159, 177, 257] but

are probably best avoided by pregnant women[165]. An aromatic flavour[183]. Another report says that the foliage and bark are used, the resulting tea is a good source of vitamin C[226].

tcanta Broom Essential Fibre Incense Repellent Tannin WoodTolerant of regular trimming, though not into the old wood, it can be grown as a hedge[226]. The fresh branches are used as besoms[4]. Their aromatic smell serves to deodorize the house whilst sweeping[226]. The leaves have been kept in the clothes cupboard as a perfume, incense and insect repellent[257]. The leaves and stems have been used as an incense[257]. An essential oil is obtained from the leaves and branches, it is used in perfumery and in medicines[46, 57, 61, 226]. It is poisonous if taken internally[65]. This essential oil also has insect repellent properties[106]. The tough and stringy bark has been used to weave fibre bags[257]. The bark is a source of tannin[257]. Wood - light, soft, not strong, brittle, coarse grained, very durable, easily worked, does not warp[61, 82, 171, 226, 235]. It weighs 20lb per cubic foot[235]. Used especially where contact with water cannot be avoided, for canoes, garden buildings, shingles, posts etc[11, 61, 82, 171, 226].

dwatta Alterative Anthelmintic Antinflammatory Antirheumatic Antiseptic Antiviral Aromatic Astringent Diaphoretic Diuretic Emmenagogue Homeopathy Rubeifacient Vitamin CAmerican arbor-vitae was much used by many native North American Indian tribes as a medicine to treat fevers, coughs, headaches, swollen hands and rheumatic problems[254, 257]. The plant has an established antiviral activity and is most commonly used in modern herbalism to treat warts and polyps, being prescribed both internally and externally for these conditions[254]. The plant can be used to induce menstruation and so should not be prescribed for pregnant women[238]. The recently dried leafy young twigs are alterative, anthelmintic, anti-inflammatory, antiseptic, aromatic, astringent, diaphoretic, diuretic and emmenagogue[4, 7, 21, 165]. The plant is being used internally in the treatment of cancer[238], especially cancer of the uterus[254]. A tea made from the leaves is used in the treatment for bronchitis and other respiratory problems, colds, headaches and as a cough syrup[222, 254]. The plants diuretic properties make it useful in treating acute cystitis and bed-wetting in children[254]. The leaves are used in steam baths in the treatment of rheumatism, arthritis, colds etc[222]. Externally, the leaves are used as a wash for swollen feet and burns[222]. Extracts of the leaves can be painted on painful joints or muscles as a counterirritant, improving local blood supply and thus facilitating the removal of toxins, easing pain and stiffness[254]. A tincture of the leaves has been used in the treatment of warts, piles, bed sores and fungal infections[222]. The leaves and young twigs can be harvested as required and used fresh or dried[238]. 'Oil of white cedar', obtained from the leaves, is an essential oil that is antiseptic, expectorant and rubeifacient[213, 222]. It is used internally to promote menstruation and relieve rheumatism[213]. This volatile oil is toxic and poisoning from overdoses has occurred[213], it should only be used under the supervision of a qualified practitioner and should not be prescribed for pregnant women[238]. The oil also stimulates the heart and causes convulsions in high doses[213]. A tea of the inner bark is used to promote menstruation[213] and in the treatment of consumption and coughs[222]. A homeopathic remedy is made from the leaves and twigs, gathered when the tree is flowering[232]. It is used in the household as a treatment against warts, but also has a range of other applications that should only be prescribed by a competent homeopath[7, 232].

nrakta Eastern N. America - Nova Scotia to Georgia, west to Illinois and Minnesota. ksacta Swamps and cool rocky banks of streams[43], forming dense almost impenetrable forests[82, 165]. Also found on rocky soils[226]. Plants are usually found on neutral to alkaline limestone soils[226].

propta Seed - best sown when ripe in the autumn in a cold frame[113]. Stored seed germinates best if given a short cold stratification[113]. It can be sown in a cold frame in late winter. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. If growing large quantities of plants, the seed can be sown in an outdoor seed bed in mid spring[78].

4.2.150 Polygonatum sibiricum

Huang Jing

3 tin 7 cyuc 2 kcaak 0 tcan 2 dwat 1 m hkuc pcmimhnt cyuti tcup hwicli hrasjlutnyk hpa7tli flatpriklwis hpa7tmwattli fyfkrxre7t hjoni

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

pcista Although no reports of toxicity have been seen for this species, some members of this genus have poisonous fruits and seeds.

kcakta Edible Parts: Leaves RootEdible Uses: Young shoots - cooked[105, 176]. It can be used as an asparagus substitute. Root - cooked[105, 176]. Rich in starch.

tcanta Insecticide MiscellanyThe plant has insecticidal properties[218].

dwatta Antibacterial Antifungal Antirheumatic Demulcent Lenitive Miscellany TonicThe root is antibacterial, antifungal, antirheumatic, antiseptic, demulcent, lenitive, tonic and vasodilator[176, 218]. Its use lowers the blood pressure and prevents atherosclerosis and fatty infiltration in the liver[176]. It is used in the treatment of dry coughs due to chronic bronchitis and pulmonary tuberculosis, fatigue and poor appetite[176].

nrakta E. Asia - N. China, Mongolia and Siberia. ksacta Woods and sandy places near the sea[74]. Forests, thickets and shaded slopes at elevations of 800 - 2800 metres in China[266].

propta Seed - best sown as soon as it is ripe in early autumn in a shady part of a cold greenhouse[200]. Sow stored seed as early in the year as possible. Germination can be slow, they may not come true to type[200] and it takes a few years for them to reach a good size. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a shady position in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in March or October. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Prefers a fertile humus rich moisture retentive well-drained soil in cool shade or semi-shade[200]. Plants are intolerant of heat and drought but tolerate most other conditions[200]. This species is closely related to *P. verticillatum*[200]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. The young shoots of most members of this genus are very attractive to slugs[K]. Plants adopt a semi-climbing habit, scrambling through small shrubs[187]. Hybridizes with other species in this genus.

4.2.151 Aralia hispida

Bristly Sarsaparilla

3 tin 7 cyuc 2 kcaak 2 tcan 1 dwat 1 m hkuc hmimhtut cyuti kyuctcup hwicli hyishrasjlutnyk hpa7tli flatpriklwis hpa7tmwattli xr7t hjoni

drutta Aralia hispida is a deciduous Shrub growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Edible Uses: Drink TeaA tea is made from the roots[183]. The roots are also used for making 'root beer'[183].

tcanta Wildlife shelter. Nectary shelter [1-2].

dwatta Alterative Cardiac Diaphoretic Diuretic TonicA tea made from the leaves is diaphoretic[222]. The root is alterative and tonic[257]. An infusion of the root has been used in the treatment of heart diseases[257]. The bark, and especially the root bark, is diuretic and tonic[4, 222]. A homeopathic remedy is made from the fresh root[4]. It has alterative, diaphoretic and diuretic properties and is considered to be a good treatment for dropsy[4].

nrakta Eastern and Central N. America - E. Canada to Virginia, west to Illinois and Minnesota. ksacta Rocky or sandy sterile soils, Alberta to Saskatchewan, Manitoba and Quebec[204].

propta Seed - best sown as soon as ripe in a cold frame. Stored seed requires 3 - 5 months of cold stratification. Germination usually takes place within 1 - 4 months at 20°C[134]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in a greenhouse for at least their first winter. Once the plants are 25cm or more tall, they can be planted out into their permanent positions, late spring or early summer being the best time to do this. Root cuttings 8cm long, December in a cold frame[11, 78]. Store the roots upside down in sand and pot up in March/April. High percentage[78]. Division of suckers in late winter[11]. Very easy, the suckers can be planted out direct into their permanent positions if required.

nwatta Prefers a moderately fertile deep moisture-retentive well-drained loam and a position in semi-shade but also succeeds in a sunny position[200]. Requires a sheltered position[200]. Plants are hardier when grown on poorer soils[200]. This species is especially tolerant of poor dry soils[200]. Prefers an acid soil[184]. Dormant plants are hardy to at least -15°C[184, 200]. The young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. The whole plant has an unpleasant smell[4]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A clumping plant, forming a colony from shoots away from the crown but with a limited spread [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

4.2.152 Bupleurum falcatum

Thorow-Wax

3 tin 7 cyuc 2 kcaak 0 tcan 2 dwat 1 m hkuc hmimhtut cyuti kyuctcup hwicli hrasjlutnyk hpa7tli flatpriklwis hpa7tmwattli fyfkrxre7t hjoni

drutta Bupleurum falcatum is a PERENNIAL growing to 1 m (3ft 3in) by 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: LeavesEdible Uses: RutinLeaves and young shoots - cooked[2, 105, 177].The new growth in spring and autumn is used[178, 179]. It is a good source of rutin[179].

tcanta FuelThe old plant is used as a fuel[178, 179]. dwatta Alterative Analgesic Antibacterial Antinflammatory Antiperiodic Antipyretic Antiviral Carminative Diaphoretic Emmenagogue Haemolytic Hepatic Malaria Pectoral Poultrice SedativeA paste of the plant is applied to boils[272]. The juice of the roots, mixed with the juice of *Centella asiatica*, is used in the treatment of liver diseases[272]. This species is closely related to *B. chinense* and quite possibly has the same uses. It is certainly worthy of some research. The uses of *B. chinense* are as follows:- Bei chai hu root has been used in traditional Chinese medicine for at least 2,000 years[238]. It is a bitter herb that is used to harmonize the body, balancing the different organs and energies within the body[254]. It strengthens the digestive tract, acts as a tonic for the liver and circulatory system, lowers fevers and has anti-viral effects[238]. The root is alterative, analgesic, antibacterial, anti-inflammatory, antiperiodic, antipyretic, antiviral, carminative, diaphoretic, emmenagogue,

plant them out in late spring of the following year. Cuttings of mature wood, November in a frame[11].

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[1, 200]. The fruit is a good wildlife food source, especially for birds[200]. Hybridizes freely with other members of this genus[200]. A very ornamental plant, there are a great many named varieties[200]. 'Robin', 'Hopa' and 'Tradescant' have all been mentioned for their edible fruit[200]. Plants in this genus are notably susceptible to honey fungus[200].

4.2.148 *Potentilla multifida*

3 tlin 7 cyuc 2 kcaak 0 tcan 0 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikwiw hpa7tmwatli fyfjxre7t hjonli

drutta *Potentilla multifida* is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Root - cooked[61]. Starchy[105, 177].

nrakta Europe to E. Asia. ksacta Mountainous regions in Europe[50]. Alpine valleys, meadows on mountain slopes, sandy riverbanks, ravines and forest edges at elevations of 700 - 5000 metres in northern China[266].

propta Seed - sow early spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Easily grown in a well-drained loam, preferring a position in full sun but tolerating shade[1]. Prefers an alkaline soil but tolerates a slightly acid soil[200]. Members of this genus are rarely if ever troubled by browsing deer[233].

4.2.149 *Artemisia vulgaris*

Mugwort, Common wormwood, Felon Herb, Chrysanthemum Weed, Wild Wormwood

3 tlin 9 cyuc 2 kcaak 1 tcan 3 dwat 1.2 m hkuc hmimhtut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatprikwiw hpa7tmwatli xre7t hjonli

drutta *Artemisia vulgaris* is a PERENNIAL growing to 1.2 m (4ft) by 0.7 m (2ft 4in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

pcista The plant might be poisonous in large doses[21]. Skin contact can cause dermatitis in some people[222]. Probably unsafe for pregnant women as it may stimulate the uterus to contract and induce abortion [301].

kcakta Edible Parts: LeavesEdible Uses: Colouring CondimentLeaves - raw or cooked[2, 9, 12, 17, 177]. Aromatic and somewhat bitter[244]. Their addition to the diet aids the digestion and so they are often used in small quantities as a flavouring, especially with fatty foods[183, 244]. They are also used to give colour and flavour to glutinous-rice dumplings (Mochi)[183, 244]. The young shoots are

used in spring[46]. In Japan the young leaves are used as a potherb[183]. The dried leaves and flowering tops are steeped into tea[183]. They have also been used as a flavouring in beer, though fell into virtual disuse once hops came into favour[4].

tcanta Insecticide Repellent TinderThe fresh or the dried plant repels insects, it can be used as a spray but caution is advised since it can also inhibit plant growth[20]. A weak tea made from the infused plant is a good all-purpose insecticide[201]. An essential oil from the plant kills insect larvae[218]. The down on the leaves makes a good tinder for starting fires[115]. A number of species of Lepidoptera (butterflies and moths) feed on the leaves and flowers.

dwatta Anticonvulsant Antidepressant Antiemetic Antiseptic Antispasmodic Appetizer Carminative Cholagogue Diaphoretic Digestive Diuretic Emmenagogue Expectorant Foot care Haemostatic Nervine Purgative Stimulant Tonic Women's complaintsMugwort has a long history of use in herbal medicine especially in matters connected to the digestive system, menstrual complaints and the treatment of worms[238]. It is slightly toxic, however, and should never be used by pregnant women, especially in their first trimester, since it can cause a miscarriage[7, 238]. Large, prolonged dosage can damage the nervous system[268]. All parts of the plant are anthelmintic, antiseptic, antispasmodic, carminative, cholagogue, diaphoretic, digestive, emmenagogue, expectorant, nervine, purgative, stimulant, slightly tonic and used in the treatment of women's complaints[4, 7, 13, 21, 147, 165, 178, 201]. The leaves are also said to be appetizer, diuretic, haemostatic and stomachic[176, 218, 222]. They can be used internally or externally[218]. An infusion of the leaves and flowering tops is used in the treatment of nervous and spasmodic affections, sterility, functional bleeding of the uterus, dysmenorrhoea, asthma and diseases of the brain[176, 243]. The leaves have an antibacterial action, inhibiting the growth of *Staphylococcus aureus*, *Bacillus typhi*, *B. dysenteriae*, streptococci, *E. coli*, *B. subtilis*, *Pseudomonas* etc[176]. The leaves are harvested in August and can be dried for later use[4]. The stem is also said to be antirheumatic, antispasmodic, and stomachic[218]. The roots are tonic and antispasmodic[243]. They are said to be one of the best stomachics[4]. They are harvested in the autumn and dried for later use[4]. The leaves, placed inside the shoes, are said to be soothing for sore feet[238]. The compressed dried leaves and stems are used in moxibustion[176, 178, 218, 222, 238]. Another report says that the down from the leaves is used[4].

nrakta Throughout most temperate regions of the northern hemisphere, including Britain. ksacta Common on hedgerbanks and waysides, uncultivated and waste land[4, 7, 17].

propta Seed - surface sow from late winter to early summer in a greenhouse and do not allow the compost to dry out. When large enough to handle, prick out the seedlings into individual pots. If growth is sufficient, they can be planted out into their permanent positions in the summer, otherwise grow them on in a cold frame for their first winter and then plant them out in the spring. Division in spring or autumn. Basal cuttings in late spring. Harvest the young shoots when about 10 - 15cm long, pot up in a lightly shaded position in a greenhouse or cold frame and plant them out when well rooted. Very easy.

nwatta Landscape Uses:Border. Easily grown in a well-drained circumneutral or slightly alkaline loamy soil, preferring a sunny position and a moist soil[1, 14, 200]. Plants are longer lived, more hardy and more aromatic when they are grown in a poor dry soil[245]. Tolerates a pH in the range 4.8 to 8.2. Established plants are drought tolerant[200]. Mugwort is an aggressive and invasive plant[14], it inhibits the growth of nearby plants by means of root secretions[20, 201]. The sub-species *A. vulgaris parviflora*. Maxim. is the form that is eaten in China[179]. There are some named varieties[200]. 'White' is a taller plant than the type species, growing to 1.5 metres. It has a strong, rather resinous or "floral" taste similar to chrysanthemum leaves and is used in soups or fried as a side dish[183]. Members of this genus are rarely if ever troubled by browsing deer[233]. Special Features:Edible, Not North American native, Invasive, Attracts butterflies, Suitable for dried flowers, Fragrant flowers, Inconspicuous flowers or blooms.

Grow the plants on for two years and then plant them out into their permanent positions in late autumn or early spring. Cuttings of half-ripe wood, 5 - 8cm with a heel, July/August in a shaded frame. Forms roots by the end of September but it should be overwintered in a frame[78]. Cuttings of almost ripe wood, 5 - 10cm with a heel, September in a cold frame. Forms roots in the following summer. Plant out in autumn or spring[78].

nwatta Landscape Uses:Firewood, Hedge, Screen, Superior hedge, Specimen. Prefers a permanently moist soil[1], it is intolerant of dry soils[11]. A useful plant for very poorly-drained soils[185, 200]. The best stands in America are on well-drained soils[11]. Grows well in heavy clay soils. Succeeds in sandy soils[188] and on chalk[200]. A very hardy tree, tolerating very cold winters with temperatures down to -46°C[200, 238]. In cold weather the leaves turn brown, becoming green again in the spring[226]. It is usually slow growing and short-lived in cultivation in Britain and rarely looks thrifty[81, 185]. However, there are some good specimens in western Britain[4, 14]. Some cultivars are more healthy, 'Lutea' is growing very well in several places and 'Spiralis' is also growing well[185]. Trees live 200 - 300 years in the wild[226]. Sometimes planted as a timber tree in C. Europe[50]. Plants cannot regenerate from old wood. Pruning is not normally necessary for this species, any pruning that is carried out should be done with care[238]. The wood and the foliage are strongly aromatic[226]. The crushed leaves have a scent of apples[185]. Special Features: Attracts birds, North American native, Wetlands plant, Inconspicuous flowers or blooms.

4.2.113 *Sorbus aucuparia*

Mountain Ash, European mountain ash
3 tlin 6 cyuc 2 kcaak 3 tcan 2 dwat 15 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatprikwiw hpa7tmwatli xre7t hjonli

drutta *Sorbus aucuparia* is a deciduous Tree growing to 15 m (49ft) by 7 m (23ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 2 and is not frost tender. It is in flower from May to June, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure. It can tolerate atmospheric pollution.

pcista Large quantities of the raw fruit can cause vomiting, especially if people are not used to the fruit. Seeds probably contain hydrogen cyanide. this is the ingredient that gives almonds their characteristic flavour. Unless the seed is very bitter it should be perfectly safe in reasonable quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: Fruit Leaves OilEdible Uses: Coffee Oil TeaFruit - raw or cooked[2, 3, 5, 7, 9]. The fruit is very acid and large quantities of the raw fruit can cause stomach upset[10, 13]. It can be used to make delicious, if slightly acidulous, jams and preserves[7], the fruit can also be dried and used as a flour mixed with cereals[2, 66]. The fruit is about 7.5mm in diameter[200] and is produced in quite large bunches making harvest easy[K]. The leaves and flowers are used as a tea substitute[61, 183]. Young leaves are said to be a famine food but they contain a cyanogenic glycoside so you should be very hungry before even thinking of eating them[179]. A coffee substitute[183]. The report was referring to the fruit, it probably means the roasted seed.

tcanta Cosmetic Dye Oil Shelterbelt Tannin WoodAn oil is obtained from the seed[13]. A cosmetic face-mask is made from the fruits and is used to combat wrinkled skin[7]. A black dye is obtained from the young branches[74]. All parts of the plant contain tannin and can be used as a black dye[4]. Trees are very wind resistant and can be used in shelterbelt plantings[11, 200]. Wood - hard, fine grained, compact and

elastic. It is highly recommended by wood turners and is also used to make hoops for barrels, cogs and furniture[7, 13, 61, 74, 113].

dwatta Antirheumatic Antiscorbutic Aperient Astringent Diuretic Hypoglycaemic Laxative Vitamin CThe bark is astringent, it is used in the treatment of diarrhoea and as a vaginal injection for leucorrhoea etc[4]. The fruit is antiscorbutic and astringent[4, 7]. It is normally used as a jam or an infusion to treat diarrhoea and haemorrhoids[254]. An infusion can also be used as a gargle for sore throats and as a wash to treat haemorrhoids and excessive vaginal discharge[254]. The seeds contain cyanogenic glycosides which, in reaction with water, produce the extremely toxic prussic acid[254]. In small quantities this acts as a stimulant to the respiratory system but in larger doses can cause respiratory failure and death[K]. It is therefore best to remove the seeds when using the fruit medicinally or as a food[254]. Both the flowers and the fruit are aperient, mildly diuretic, laxative and emmenagogue[9, 13, 21]. An infusion is used in the treatment of painful menstruation, constipation and kidney disorders[9].

nrakta Europe, including Britain, south and east from Iceland to Spain, Macedonia and the Caucasus. ksacta Woods, scrub and mountain rocks, mainly on lighter soil, rare or absent on clays or soft limestones. It is found at higher elevations than any other native tree[17].

propta Seed - best sown as soon as it is ripe in a cold frame[78, 80]. If you have sufficient seed it can be sown in an outdoor seedbed[78, 80]. Stored seed germinates better if given 2 weeks warm then 14 - 16 weeks cold stratification[98], so sow it as early in the year as possible. Prick out the seedlings into individual pots when they are large enough to handle. Seedlings are very slow to put on top-growth for their first year or two[11], but they are busy building up a good root system. It is best to keep them in pots in a cold frame for their first winter and then plant them out into their permanent positions in late spring.

nwatta Landscape Uses:Specimen. Succeeds in most reasonably good soils in an open sunny position[11]. Grows well in heavy clay soils. Tolerates some shade[186], though it fruits better in a sunny position[K]. Prefers a cool moist position and a lighter neutral to slightly acid soil[11, 13, 200]. Dislikes shallow soils or drought[11, 200]. Succeeds on chalk or acid peats[98, 186]. A very wind firm tree tolerating very exposed and maritime positions[186, 200]. Tolerates atmospheric pollution[200]. Some named varieties have been developed for their improved fruits which are larger and sweeter than the type[183]. Plants, and especially young seedlings, are quite fast growing[186]. The fruit is very attractive to birds. 28 species of insects are associated with this tree[186]. Responds well to coppicing[186]. Plants are susceptible to fireblight[188]. Special Features:Not North American native, Attractive flowers or blooms. The plant is heat tolerant in zones 7 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

4.2.114 *Hemiptelea davidii*

3 tlin 7 cyuc 2 kcaak 0 tcan 1 dwat 15 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikwiw hpa7tmwatli xre7t hjonli

drutta *Hemiptelea davidii* is a deciduous Tree growing to 15 m (49ft 3in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in April, and the seeds ripen from

September to October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves OilEdible Uses: Oil TeaYoung leaves - cooked. Mixed with rice dumplings[177]. The tender leaves make a good beverage[266].

tcanta Fibre Hedge Hedge Oil WoodPlants are grown as a hedge in China[109]. The fibre from the bark is used for manufacturing staple rayon and sacks[266]. An oil is extracted from the seeds[266]. The report does not say if the oil is edible, nor does it give any uses. Wood - hard. It is used for making utensils[266].

dwatta Demulcent Diuretic Febrifuge LenitiveDemulcent, diuretic, febrifuge, lenitive[178].

nrrakta E. Asia - China, Korea. ksacta Hedges, loess banks, banks of soil and debris[109]. Hill slopes and trailsides, often planted when found around houses, at elevations below 2000 metres[266].

propta Seed - best harvested as soon as it is ripe but before it has fully dried on the plant and sown immediately in a cold frame. Stored seed requires stratification and should be sown as soon as possible[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Seed can be stored cold and dry[200].

nwatta Prefers a deep moist loamy soil, succeeding in acid and alkaline conditions[200]. Relatively shade tolerant[200]. Plants are probably resistant to Dutch Elm disease[200]. Plants can be hermaphrodite or monoecious.

4.2.115 Malus x robusta

3 tlin 7 cyuc 2 kcaak 0 tcan 0 dwat 12 m hkuc hmimhtut cyutli tcup hwicli hrasjnutnykfrip hpa7tli flatprikwis hpa7tmwatli xre7t hjonli

drutta Malus x robusta is a deciduous Tree growing to 12 m (39ft) by 10 m (32ft). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[183]. The fruit is rather variable in size and is usually about 1 - 3cm in diameter[200]. A firm and juicy flesh with rather an acid flavour, we found it pleasant in small quantities when fully ripe[K].

tcanta RootstockUsed as a vigorous winter-hardy rootstock for the cultivated apple, *M. sylvestris* domestica, it is somewhat resistant to fireblight but susceptible to crown rot[183].

nrrakta A hybrid of garden origin, *M. baccata* x *M. prunifolia*. ksacta Not known in the wild.

propta Seed - this is a hybrid species and will not breed true. The seed is best sown as soon as it is ripe in the autumn in a cold frame. It usually germinates in late winter. Stored seed requires stratification for 3 months at 1°C and should be sown in a cold frame as soon as it is received[200]. It might not germinate for 12 months or more. Prick out the seedlings into individual pots as soon as they are large enough to handle. If given a rich compost they usually grow away quickly

and can be large enough to plant out in late summer, though consider giving them some protection from the cold in their first winter. Otherwise, keep them in pots in a cold frame and plant them out in late spring of the following year. Cuttings of mature wood, November in a frame[11].

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[1, 200]. The fruit is a good wildlife food source, especially for birds[200]. Hybridizes freely with other members of this genus[200]. There are some named varieties, selected for their ornamental value[183]. 'Fairy' and 'Joan' both have larger fruits than the type, up to 4cm in diameter[200]. Plants in this genus are notably susceptible to honey fungus[200].

4.2.116 Betula populifolia

Grey Birch

3 tlin 6 cyuc 2 kcaak 3 tcan 1 dwat 12 m hkuc htut cyutli kyuctcup hwicli hyishrasjnutnykfrip hpa7tli flatprikwis hpa7tmwatli hjonli

drutta Betula populifolia is a deciduous Tree growing to 12 m (39ft 4in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in April, and the seeds ripen in September. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant is not wind tolerant.

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

kcakta Edible Parts: Inner bark SapEdible Uses: Inner bark - cooked or dried and ground into a meal. The meal can be used as a thickener in soups etc, or be added to flour when making bread, biscuits etc. Inner bark is generally only seen as a famine food, used when other forms of starch are not available or are in short supply[177, K]. Sap - sweet. Harvested in early spring, before the leaves unfurl, by tapping the trunk. The flow is best on warm days that follow frosty nights. The sap is drunk as a sweet beverage or it can be fermented to make birch beer or vinegar[177, 183]. An old English recipe for the beer is as follows: "To every Gallon of Birch-water put a quart of Honey, well stirr'd together; then boil it almost an hour with a few Cloves, and a little Limon-peel, keeping it well scum'd. When it is sufficiently boil'd, and become cold, add to it three or four Spoonfuls of good Ale to make it work...and when the Test begins to settle, bottle it up... it is gentle, and very harmless in operation within the body, and exceedingly sharpens the Appetite, being drunk ante pastum."[269].

tcanta Charcoal Pioneer WoodA pioneer species, readily invading old fields, burnt-over or cleared land and providing suitable conditions for other woodland trees to become established[226]. It is an excellent crop for very poor soils, where it grows rapidly and affords protection to the seedlings of more valuable and slower-growing trees[82]. Since this species is short-lived and not very shade tolerant, it is eventually out-competed by these other trees[226]. Wood - close-grained, soft, light, weak, not durable[61, 82, 229, 235]. It weighs 36lb per cubic foot[235]. Unimportant commercially, the wood is used locally for making clothes pegs, spools, pulp, charcoal and quite commonly as a fuel[61, 82, 229].

dwatta Antiseborrheic Astringent UrinaryThe bark is astringent. A decoction has been used to treat bleeding piles[257]. Scrapings of the inner bark have been used to treat swellings in infected cuts[257]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve *Betula* species for infections of the urinary tract, kidney and bladder stones, rheumatism (see [302] for critics of commission E).

nrrakta Eastern N. America - Quebec to Virginia and west to Indiana ksacta Found on the margins of swamps and ponds, it also commonly grows in dry sandy or gravelly barren soils, growing well in poor almost sterile soils[82, 229].

propta Seed of this species is rarely available. If obtained, it is best sown as soon as it is ripe in a cold frame, it usually germinates in the following spring. Pre-soaked seed for 24 hours and then stratify for 2 - 4 months at 1 - 8°C. It can be slow to germinate. The seed can be harvested 'green' (when it has fully developed but before it has dried and produced any germination inhibitors) and sown immediately. It should germinate in late winter. If the seed is harvested too soon it will produce very weak plants or no plants at all[80, 113]. When large enough to handle, prick the seedlings out into individual pots and grow them on until they are 20cm or more tall before planting them out in their permanent positions. Layering, which takes about 12 months, is successful with most species in this genus. Cuttings of young shoots in June or July. The cuttings should have 2 - 3 pairs of leaves, plus one pair of buds at the base. Remove a very thin slice of bark at the base of the cutting, rooting is improved if a rooting hormone is used. The rooted cuttings must show new growth during the summer before being potted up otherwise they are unlikely to survive the winter. Grafting onto the roots of *A. platanooides* is usually successful, but the graft should be made as low as possible to reduce the incident of suckers from the rootstock.

nwatta Landscape Uses:Specimen. Of easy cultivation, it prefers a good moist well-drained soil[11] and a position that is at least moderately sunny[11, 200]. Grows well in heavy clay soils. Chlorosis can sometimes develop as a result of iron deficiency when the plants are grown in alkaline soils, but in general maples are not fussy as to soil pH. A polymorphic species[58], it is closely related to *A. truncatum*[11]. Most maples are bad companion plants, inhibiting the growth of nearby plants[18, 200]. Special Features:Not North American native, Inconspicuous flowers or blooms.

4.2.145 Secale vavilovii

3 tlin 7 cyuc 2 kcaak 0 tcan 0 dwat 1.2 m hkuc htut cyutli hgactcup hwicli hrasjnutnyk hpa7tli flatprikwis hpa7tmwatli xre7t hjonli

drutta *Secale vavilovii* is an ANNUAL growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil and can tolerate drought.

kcakta Edible Parts: SeedEdible Uses: Seed - cooked[105]. Used as a cereal for making bread, cakes, thickening soups and so on[K].

nrrakta Europe - Armenia. ksacta Eroded volcanic slopes, dry gorges, irrigation ditches and as a weed of cultivated land in Turkey[93].

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

nwatta We have very little information on this species but it should succeed as an annual crop in Britain. It might be possible to sow it as an over-wintering annual. Succeeds in most soils but prefers a well-drained light soil in a sunny position[1].

4.2.146 Solidago canadensis scabra

Canadian Goldenrod

3 tlin 7 cyuc 2 kcaak 0 tcan 2 dwat 1.8 m hkuc hmimhtut cyutli tcup hwicli hrasjnutnykfrip hpa7tli flatprikwis hpa7tmwatli xre7t hjonli

drutta *Solidago canadensis scabra* is a PERENNIAL growing to 1.8 m (6ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from August to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves SeedEdible Uses: TeaYoung leaves and flowering stems - cooked[172]. Seed[22, 46, 61, 105, 161, 183]. It can be used as a thickener in soups[172]. The seed is very small and fiddly to harvest or utilize[K]. A tea can be made from the flowers and/or the leaves[172, 183].

tcanta Dye LatexA source of latex, contained in the leaves. A potentially good source of rubber[61]. Mustard, orange and brown dyes can be obtained from the whole plant[168].

dwatta Antiseptic Haemostatic Salve Skin StypticThe whole plant is antiseptic, haemostatic, salve and styptic[168, 172, 257]. An infusion of the dried powdered herb can be used as an antiseptic[168]. A poultice of the flowers has been used in the treatment of ulcers and burns[257]. A poultice of the moistened, crushed root has been used in the treatment of boils[257].

nrrakta Eastern N. America - Maine to Ontario, Nebraska, Georgia and Texas. ksacta Dry to damp thickets, roadsides and clearings[43].

propta Seed - sow spring in a cold frame. Only just cover the seed and do not allow the compost to become dry. Prick out the seedlings into individual pots when they are large enough to handle, and grow them on for their first winter in pots. Plant them out into their permanent positions in spring or early summer. Division in spring or autumn. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Succeeds in any moderately fertile moisture retentive soil in sun or semi-shade[200]. Grows well in heavy clay soils. A rather greedy plant, it is apt to impoverish the soil[1]. Hybridizes freely with *S. canadensis*[43]. The plant attracts various beneficial insects such as ladybirds, lacewings and hoverflies to the garden, these insects will help to control insect pests in the garden[201, 238].

4.2.147 Malus x adstringens

3 tlin 7 cyuc 2 kcaak 0 tcan 0 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjnutnykfrip hpa7tli flatprikwis hpa7tmwatli xre7t hjonli

drutta *Malus x adstringens* is a deciduous Tree. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. A rather acid flavour. The fruit is about 4 - 5cm in diameter[200].

nrrakta A hybrid species of garden origin, *M. baccata* x *M. pumila*. ksacta Not known in the wild.

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

pcista Although no reports of toxicity have been seen for this species, some members of this genus have poisonous fruits and seeds.

kcakta Edible Parts: Leaves RootEdible Uses: Young shoots - cooked[102]. They can be used as an asparagus substitute. Root - cooked[102]. The root is up to 18mm thick[270]. It is rich in starch.

dwatta Haemostatic OphthalmicA decoction of the plant has been used in the treatment of spitting up of blood[257]. An infusion of the roots has been used as an eye wash in the treatment of snow blindness[257].

nrakta Eastern to Central N. America - Nova Scotia, Manitoba and southwards. ksacta Rich shady woods[43]. Rich moist wooded slopes and coves from sea level to 1100 metres[270].

propta Seed - best sown as soon as it is ripe in early autumn in a shady part of a cold greenhouse[200]. Sow stored seed as early in the year as possible. Germination can be slow, they may not come true to type[200] and it takes a few years for them to reach a good size. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a shady position in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in March or October. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Prefers a fertile humus rich moisture-retentive well-drained soil in cool shade or semi-shade[200]. Plants are intolerant of heat and drought but they tolerate most other conditions[200]. This species is closely related to *P. odoratum*[200]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. The young shoots of most members of this genus are very attractive to slugs[K]. Hybridizes with other members of this genus[200].

4.2.143 Leonurus cardiaca

Motherwort, Common motherwort

3 tlin 7 cyuc 2 kcaak 0 tcan 3 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hyhshras[utnyik hpa7tli flatprik-lwis hpa7tmwatli xre7t hjonli

drutta *Leonurus cardiaca* is a PERENNIAL growing to 1 m (3ft 3in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to September, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Skin contact with this plant can cause dermatitis in susceptible people[21]. The fragrant essential oil can cause photosensitization[274]. Grazing animals can have their mouths injured by the sharp teeth of the calyces[274]. Avoid during pregnancy as it is a uterine stimulant although it has been used during labour [301].

kcakta Edible Parts: Edible Uses: Condiment TeaThe fresh or dried flowers can be used as a flavouring in soups, particularly lentil or split pea[183]. They are also used as a flavouring in beer[183]. Fresh or dried flowers can be used to make a tea[183].

tcanta DyeA dark olive-green dye is obtained from the leaves[46, 61, 145].

dwatta Antirhythmic Antiflatulent Antispasmodic Astringent Birthing acid Cardiac Diaphoretic Emmenagogue Homeopathy Nervine Sedative Stomachic Tonic Women's complaintsMotherwort is especially valuable in the treatment of female weaknesses and disorders, allaying nervous irritability, inducing quiet and passivity of the whole nervous system[4]. It is also seen as a remedy for heart palpitations, it has a strengthening effect, especially on a weak heart[254]. The antispasmodic and sedative effects promote relaxation rather than drowsiness[254]. The leaves are antispasmodic, astringent, cardiac, diaphoretic, emmenagogue, nervine, sedative, stomachic, tonic and uterine stimulant[4,

9, 21, 46, 165, 222]. They are taken internally in the treatment of heart complaints (notably palpitations) and problems associated with menstruation, childbirth and menopause, especially of nervous origin[238]. Although an infusion can be used, the taste is so bitter that the plant is usually made into a conserve or syrup[244]. An alcoholic extract is said to possess superior action to valerian (*Valeriana officinalis*)[240]. The plant has been found effective in the treatment of functional heart complaints due to autonomic imbalance, and also as an anti-thyroid treatment, though it needs to be taken for several months for these effects to be noticed[244]. The whole herb is harvested in August when in flower and can be dried for later use[4]. It should not be prescribed in the earlier stages of pregnancy or where periods are heavy[238, 254]. A homeopathic remedy is made from the plant[9]. It is used in the treatment of heart complaints, amenorrhoea, menopausal problems and flatulence[9]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve *Leonurus cardiaca* Motherwort for nervous heart complaints (see [302] for critics of commission E).

nrakta Europe. Naturalized in Britain. ksacta Hedge banks, waste places etc[9, 17], usually on gravelly or calcareous soils[4].

propta Seed - sow spring in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. If you have sufficient seed then it can be sown in an outdoor seedbed, or even in situ. Division in spring or autumn[238]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta An easily grown plant that succeeds in most soils[4], preferring one on the poor side[108]. This plant was at one time cultivated for its medicinal uses[4]. The whole plant is deliciously pungent when handled[245]. The plant often self-sows when well-seeded[200]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [2-1].

4.2.144 Acer bicolor

Maple

3 tlin 8 cyuc 2 kcaak 0 tcan 1 dwat m hkuc hmimhtut cyutli tcup hwicli hras[utnyik hpa7tli flatprik-lwis hpa7tmwatli hjonli

drutta *Acer mono* is a deciduous Tree growing to 15 m (49ft 3in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from April to May, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves SapEdible Uses: The sap contains a certain amount of sugar and can either be used as a drink, or can be concentrated into a syrup by boiling off the water[105, 177]. The syrup is used as a sweetener on many foods. The concentration of sugar is considerably lower than in the sugar maples (*A. saccharum*). The tree trunk is tapped in the early spring, the sap flowing better on warm sunny days following a frost. The best sap production comes from cold-winter areas with continental climates. Leaves - cooked. A famine food, they are only used when all else fails[179].

tcanta Fuel Preservative WoodThe leaves are packed around apples, rootcrops etc to help preserve them[18, 20]. Wood - hard, close grained[46]. Used as a fuel[46].

dwatta Astringent IrritantThe leaves are an irritant[240]. The bark is astringent[240].

nrakta E. Asia - China, Japan, Korea, Mongolia and eastern Russia ksacta Mountains all over Japan[58]. Hillsides, mountain valleys and forests from sea level to 1800 metres in China[266].

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

nwatta Landscape Uses:Firewood, Specimen. Succeeds in a well-drained loamy soil in a sunny position[11, 200]. Tolerates most soils doing well on poor ones[1] and on heavy clays. A fast growing tree, though it rarely lives longer than 50 years[200, 229]. It is a pioneer species of abandoned fields, burnt-over lands, cleared woodlands etc[200, 229]. A fairly wind-tolerant plant[200], but it is shallow-rooted and older trees are often uprooted by winds and heavy snow in the wild[229]. Hybridizes freely with other members of this genus[50], especially with *B. papyrifera*[43]. A good plant to grow near the compost heap, aiding the fermentation process[20]. Trees are notably susceptible to honey fungus[200]. Special Features: North American native, Naturalizing, Inconspicuous flowers or blooms.

4.2.117 Malus yunnanensis

Crabapple

3 tlin 8 cyuc 2 kcaak 0 tcan 0 dwat 10 m hkuc hmimhtut cyutli tcup hwicli hras[utnyik hpa7tli flatprik-lwis hpa7tmwatli xre7t hjonli

drutta *Malus yunnanensis* is a deciduous Tree growing to 10 m (32ft) by 6 m (19ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in May, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177]. A gritty texture[1]. The fruit is harsh and acid[11], though it improves somewhat when it has been frosted[K]. Quite small, it is 10 - 15mm in diameter[200].

tcanta RootstockThe plant is very adaptable to poor environmental conditions and can be used as stock for grafting apple trees in W China[266].

nrakta E. Asia - China. ksacta Mixed forests on slopes or by streams in valleys at elevations of 1600 - 3800 metres in Guizhou, Hubei, Sichuan and Yunnan Provinces[266].

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

a cold frame and plant them out in late spring of the following year. Cuttings of mature wood, November in a frame[11].

nwatta Landscape Uses:Border, Standard, Specimen, Street tree. An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[1, 200]. The fruit is a good wildlife food source, especially for birds[200]. Hybridizes freely with other members of this genus[200]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features:Not North American native, Fragrant flowers, Attractive flowers or blooms.

4.2.118 Acer tataricum

Tatarian Maple

3 tlin 7 cyuc 2 kcaak 0 tcan 0 dwat 9 m hkuc hmimhtut cyutli tcup hwicli hras[utnyik hpa7tli flatprik-lwis hpa7tmwatli hjonli

drutta *Acer tataricum* is a deciduous Tree growing to 9 m (29ft 6in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from May to June, and the seeds ripen in September. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Sap SeedEdible Uses: SweetenerThe sap contains a certain amount of sugar and can either be used as a drink, or can be concentrated into a syrup by boiling off the water[74]. The syrup is used as a sweetener on many foods. The concentration of sugar is considerably lower than in the sugar maples (*A. saccharum*). The tree trunk is tapped in the early spring, the sap flowing better on warm sunny days following a frost. The best sap production comes from cold-winter areas with continental climates. Seed - cooked[105, 177]. The wings are removed and the seeds are then boiled[2].

tcanta Companion PreservativeThe leaves are packed around apples, rootcrops etc to help preserve them[18, 20].

nrakta S.E. Europe, W. Asia. ksacta Found in deciduous oak scrub, rocky slopes and river valleys at altitudes between 500 - 1700 metres in Turkey[93].

propta Seed - best sown as soon as it is ripe in a cold frame, it usually germinates in the following spring. Pre-soak stored seed for 24 hours and then stratify for 2 - 4 months at 1 - 8°C. It can be slow to germinate. The seed can be harvested 'green' (when it has fully developed but before it has dried and produced any germination inhibitors) and sown immediately. It should germinate in late winter. If the seed is harvested too soon it will produce very weak plants or no plants at all[80, 113]. When large enough to handle, prick the seedlings out into individual pots and grow them on until they are 20cm or more tall before planting them out in their permanent positions. Layering, which takes about 12 months, is successful with most species in this genus. Cuttings of young shoots in June or July. The cuttings should have 2 - 3 pairs of leaves, plus one pair of buds at the base. Remove a very thin slice of bark at the base of the cutting, rooting is improved if a rooting hormone is used. The rooted cuttings must show new growth during the summer before being potted up otherwise they are unlikely to survive the winter.

nwatta Landscape Uses:Container, Pollard, Standard, Specimen, Street tree. Of easy cultivation, it prefers a good moist well-drained soil on the acid side and a sunny position[11, 182]. Grows well in heavy clay soils. Chlorosis can sometimes develop as a result of iron deficiency when the plants are grown in alkaline soils, but in general maples are not fussy as to soil pH. Trees usually fruit abundantly in Britain[11]. A bad companion plant, inhibiting the growth of nearby plants[18, 20]. Special Features:Not North American native, Fragrant flowers, Inconspicuous flowers or blooms.

4.2.119 Acer glabrum

Rock Maple, Rocky Mountain maple, Douglas maple, Greene's maple, New Mexico maple, Torrey maple
3 tlin 8 cyuc 2 kcaak 0 tcan 1 dwat 9 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnykrip hpa7tli flatprik-
wis hpa7tmwatli nyanhjen hjonli

drutta Acer glabrum is a deciduous Tree growing to 9 m (29ft 6in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in April, and the seeds ripen in September. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by In-
sects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Inner bark Leaves SeedEdible Uses: CondimentEdible young shoots - cooked. They are used like asparagus[85]. The seedlings, gathered in early spring, are eaten fresh or can be dried for later use[213]. The dried crushed leaves have been used as a spice[257]. Seeds - cooked. The wings are removed and the seeds boiled then eaten hot[213]. The seeds are about 6mm long[82]. Inner bark[85]. No more details are given but inner bark is often dried, ground into a powder and then used as a thickening in soups etc or mixed with cereals when making bread. An emergency food, it is usually only used when all else fails[85].

tcanta Containers Fibre Fuel Preservative WoodThe leaves are packed around apples, rootcrops etc to help preserve them[18, 20]. A fibre obtained from the inner bark is used for making mats, rope etc[99, 257]. The bark has been used to make spoons, paint containers etc[257]. Wood - tough, hard, heavy, close grained, pliable[82, 99]. It weighs 37lb per cubic foot[235]. The wood can also be used as friction sticks[99]. The green wood can be moulded.[99] The wood is too small for commercial exploitation, though it makes a good fuel[99, 229]. It was often used by native North American Indian tribes for making small items such as snowshoes, drum hoops, bows and pegs[257].

dwatta Antiemetic Birthing aid Cathartic GalactogogueA decoction of the wood and bark is said to cure nausea[213]. Another report says that this is specifically the nausea caused by smelling a corpse[257]. An infusion of the bark has been used as a cathartic[257]. A decoction of the branches, together with the branches of Amelanchier sp., was used to heal a woman's insides after childbirth and also to promote lactation[257].

nrakta Western N. America - Alaska to California, west to New Mexico. ksacta Edges of mountain streams, on rocks and in coniferous woods, 1500 - 2000 metres[82, 184].

propta Seed - best sown as soon as it is ripe in a cold frame, it usually germinates in the following spring. Pre-soak stored seed for 24 hours and then stratify for 2 - 4 months at 1 - 8°C. The seed has a hard coat and can be slow to germinate, often taking 2 years. The seed can be harvested 'green' (when it has fully developed but before it has dried and produced any germination inhibitors) and sown immediately. It should germinate in late winter. If the seed is harvested too soon it will produce very weak plants or no plants at all[80, 113]. When large enough to handle, prick the seedlings out into individual pots and grow them on until they are 20cm or more tall before planting them out in their permanent positions. Layering, which takes about 12 months, is successful with most species in this genus. Cuttings of young shoots in June or July. The cuttings should have 2 - 3 pairs of leaves, plus one pair of buds at the base. Remove a very thin slice of bark at the base of the cutting, rooting is improved if a rooting hormone is used. The rooted cuttings must show new growth during the summer before being potted up otherwise they are unlikely to survive the winter. It is very difficult to find suitable wood for cuttings.

nwatta Landscape Uses:Erosion control, Massing. Of easy cultivation, it succeeds in any soil, preferring a good moist well-drained soil[11]. Prefers a sunny position but tolerates some shade[11, 200]. Grows well in heavy clay soils. Chlorosis can sometimes develop as a result of iron deficiency when the plants are grown in alkaline soils, but in general maples are not fussy as to soil pH. Hardy to about -25°C[184]. This species grows well at Kew, a specimen

was 12 metres tall in 1967[11]. The tree is almost fastigiate[11]. Most maples are bad companion plants, inhibiting the growth of nearby plants[18, 20]. Trees are usually dioecious. Male and female trees must be grown if seed is required[226]. Special Features:North American native, Inconspicuous flowers or blooms.

4.2.120 Viburnum prunifolium

Stagberry, Black Haw, Hybrid blackhaw, Smooth Blackhaw, Blackhaw Viburnum

3 tlin 9 cyuc 2 kcaak 0 tcan 3 dwat 7.5 m hkuc
hmimhtut cyutli kyuctcup hwicli hnyishrasjlutnyk hpa7tli flat-
prikkwis hpa7tmwatli dyatxre7t hjonli

drutta Viburnum prunifolium is a deciduous Tree growing to 7.5 m (24ft) by 5 m (16ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in June, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Overdose symptoms include: nausea, dizziness, fits (seizures), visual disturbances, increased perspiration, reduced pulse rate. Rare allergic reactions. Avoid during pregnancy due to effects on the uterus [301].

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 5, 55, 62, 200, 257]. A thin dry flesh with a sweet taste[11, 159, 227]. The fruit is somewhat variable in size and quality, the best forms are nice raw whilst others are used for making preserves etc[183]. The taste is best after a frost[22, 46, 61]. The ovoid fruit is about 17mm long and contains a single large seed[200].

tcanta Hedge Hedge WoodPlants can be grown as a hedge, they can be sheared to make a formal screen[200]. Wood - heavy, hard, strong, brittle, close grained[82]. It weighs 52lb per cubic foot, but is of no commercial importance due to the small size of the trees[227, 229].

dwatta Abortifacient Anodyne Antispasmodic Astringent Birthing aid Dysentery Nervine SedativeStagberry was used by the North American Indians to treat dysentery and to arrest haemorrhage of the uterus[254, 257]. It is now considered to be a specific treatment for the relief of menstrual pain - the bark contains 'scopoletin', a coumarin that has a sedative effect on the uterus and salicin, a painkiller that is used in making aspirin[238, 254]. The bark of the root and stems is abortifacient, anodyne, antispasmodic, astringent, nervine and sedative[9, 46, 165, 222]. A tea is used internally in the treatment of painful or heavy menstruation, prolapse of the uterus, morning sickness, to prevent miscarriage and to relieve spasms after childbirth[222, 238, 254]. It is also used to treat convulsive disorders, colic and other cramping pains that affect the bile ducts, hysteria, asthma and palpitations of a nervous origin[238, 254]. The stem bark is harvested in the autumn before the leaves change colour, or in the spring before the leaf buds open[238]. The root bark is only harvested in the autumn[254]. Both barks can be dried for later use[238].

nrakta Eastern N. America - Connecticut to Florida, west to Texas and Kansas. ksacta Thickets, woodland borders, shores etc[43], and on dry rocky hillsides[3, 82].

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

htut cyutli kyuctcup hwicli hrasjlutnyk hpa7tli flatprikkwis hpa7tmwatli fyfkrre7t hjonli

drutta Tanacetum vulgare is a PERENNIAL growing to 1 m (3ft 3in) by 1.5 m (5ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from August to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate strong winds but not maritime exposure.

pcista The plant is poisonous if large quantities are ingested[20, 21, 76]. There have been cases of death in N. America from drinking strong brews of the tea, presumably as an abortifacient[207].

kcakta Edible Parts: Flowers LeavesEdible Uses: Condition TeaYoung leaflets - raw or cooked[5, 7, 13, 52, 53]. They can be added in small quantities to salads[183]. The plant is also used as a flavouring, it is a substitute for nutmeg and cinnamon[12, 27, 37, 55, 115]. This plant is not recommended for internal use[200]. The flowers have a unique flavour and are eaten or used as a garnish[183]. A bitter, somewhat lemon-flavoured tea is made from the leaves and flowering stems[183].

tcanta Compost Dye Essential Insecticide Repellent StrewingA green dye is obtained from the young shoots[4, 115]. The leaves and flowers can also be used and a yellow can also be obtained[169]. The plant is used as a strewing herb in cellars, churches etc in order to repel insects[4, 14, 20, 61, 201, 238]. Both the growing and the dried plant are said to repel flies, ants and fleas, especially if they are mixed with elder leaves (Sambucus spp.)[4, 12, 14, 18, 200, 201]. The leaves and the flowering shoots contain 0.15% of an essential oil that contains camphor, borneol and thujone[7, 213]. Both the leaves and the oil and they have been used to kill fleas and lice[213]. Thujone is an effective insecticide, but it is highly toxic to mammals when taken in excess[238]. The plant is a good addition to the compost heap, being valued for its mineral content[200]. Attractive flowers. Attracts wildlife. Landscape Uses:Container. Dynamic accumulator.

dwatta Anthelmintic Antirheumatic Antispasmodic Appetizer Bitter Carminative Emmenagogue Poulitice Stimulant TonicTansy is a commonly grown domestic remedy, useful in treating a wide range of complaints, though it is little used in modern herbalism[4, 254]. Its main value is as a vermifuge to expel intestinal worms and, to a lesser degree, to help stimulate menstrual bleeding[254]. Tansy should be used with caution, however; it is possibly unsafe for internal use, especially if you are pregnant[238]. The essential oil in the leaves is toxic and as little as ½oz can kill an adult[21, 222]. The leaves and flowering tops are anthelmintic, antispasmodic, bitter, carminative, emmenagogue, stimulant and tonic[4, 7, 9, 21, 46, 165]. An infusion of the leaves or whole plant is used to treat menstrual irregularities and as an anthelmintic, especially for children[4, 213]. It is also valuable in treating hysteria, kidney weaknesses, stomach problems, fevers and also as an emmenagogue[4]. In larger doses the plant can procure an abortion, though these doses can be poisonous[213]. Externally, tansy is used as a poultice on swellings and some eruptive skin diseases[4]. It is also used externally to kill lice, fleas and scabies, though even external use of the plant carries the risk of toxicity[254]. The plant is harvested as it is coming into flower and is dried for later use[4]. The seeds are used as an anthelmintic[207].

nrakta Most of Europe, including Britain, to the Caucasus, Armenia and Siberia. ksacta A common plant of waste ground, hedgerows etc[17].

propta Seed - sow spring in a greenhouse. Only just cover the seed and do not allow the pot to dry out. Prick out the seedlings into individual pots once they are large enough to handle and plant out in the summer. Division is very simple at almost any time in the growing season, though spring is probably best. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring.

nwatta Succeeds in an ordinary garden soil[1]. Plants thrive in almost any soil[4]. Tansy is occasionally grown

in the herb garden, though a site for growing this plant should be selected with care since it usually spreads very aggressively at the roots[4, 14]. There are some named varieties[238]. 'Fernleaf' is a more decorative compact form to about 75cm, it does not spread so quickly. A good plant to grow in the orchard, when grown under fruit trees, raspberries, roses etc it repels insects from them[201]. The flowering plant attracts hoverflies and butterflies. Special Features: Edible, Fragrant foliage, Not North American native, Invasive, Naturalizing, Suitable for cut flowers, Suitable for dried flowers, Fragrant flowers. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [2-1].

4.2.141 Cymbalaria muralis

Kenilworth Ivy
3 tlin 7 cyuc 2 kcaak 0 tcan 1 dwat m hkuc
hmim cyutli kyuctcup hwicli hrasjlutnyk hpa7tli flatprikkwis hpa7tmwatli fyfkrre7t hjonli

drutta Cymbalaria muralis is a PERENNIAL growing to 0.1 m (0ft 4in) by 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from May to September, and the seeds ripen from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers dry or moist soil.

pcista The plant might be slightly toxic[76]
kcakta Edible Parts: LeavesEdible Uses: Leaves - raw[4, 115, 177]. The leaves have been used in salads, being acrid and pungent like cress[4]. We find them rather bitter and not very pleasant, though they are available all year round and so might be useful in the winter[K]. Some caution is advised, see the notes above on toxicity.

tcanta DyeA clear yellow dye is obtained from the flowers, though it is not very permanent[4, 115].

dwatta Antiscorbutic VulneryThe herb is antiscorbutic and vulnerary[4, 7]. It is used externally as a poultice on fresh wounds to stop the bleeding[7]. There are reports that it has been used with success in India for the treatment of diabetes[4, 240].

nrakta S. Europe. Naturalized in Britain. ksacta Walls and other well-drained sites, shady rocks and woods, usually on calcareous soils[17, 50].

propta Seed - surface sow March to June in a cold frame and do not exclude light. The seed usually germinates in 2 - 4 weeks at 18°C[164]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in the summer. Division in late spring. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Prefers a moderately good soil and some shade[1]. Plants usually self-sow freely[188] and can be invasive, especially when grown on old walls[200]. They succeed both on dry-stone walls and on old mortared walls[219].

4.2.142 Polygonatum pubescens

Hairy Solomon's Seal
3 tin 7 cyuc 2 kcaak 0 tcan 1 dwat 1 m hkuc
pcimhhim cyutli tcup hwicli hrasjlutnyk hpa7tli flatprikkwis hpa7tmwatli fyfkrre7t hjonli

drutta Polygonatum pubescens is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from April to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

4.2.138 *Rheum rhaponticum*

Rhubarb, Garden rhubarb
3 tlin 7 cyuc 2 kcaak 0 tcan 3 dwat 1.2 m hkuc
hmimhtut cyutli tcup hwicli jlutnykfrrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Rheum rhaponticum* is a PERENNIAL growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in June, and the seeds ripen in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

kcakta Edible Parts: Flowers StemEdible Uses: Leaf stem - raw or cooked[1, 2, 103]. An acid flavour, they are used as a fruit substitute in tarts etc[2]. The young flower pouch, harvested before the flowers open, is said to form a dish of great delicacy[2].

tcanta Plants can be grown for ground cover when spaced about 1.8 metres apart each way[208].

dwatta *Astringent Purgative StomachicRhubarb* has a long and proven history of herbal usage, its main effect being a positive and balancing effect upon the whole digestive system. It is one of the most widely used herbs in Chinese medicine[238]. The variety species used is *R. palmatum*. Though the chemistry varies slightly, this species is used interchangeably[238]. Another report says that this species contains only small quantities of the medicinally active compounds and so it is only used as a mild laxative[244]. The root is anticholesterolemic, antiseptic, antispasmodic, antitumor, aperient, astringent, cholagogue, demulcent, diuretic, laxative, purgative, stomachic and tonic[4, 37, 57, 61, 171, 238]. Small doses act as an astringent tonic to the digestive system, whilst larger doses act as a mild laxative[232]. The root is taken internally in the treatment of chronic constipation, diarrhoea, liver and gall bladder complaints, haemorrhoids, menstrual problems and skin eruptions due to an accumulation of toxins[238]. This remedy is not prescribed for pregnant or lactating women, nor for patients with intestinal obstruction[238]. Externally, the root is used in the treatment of burns[238]. The roots are harvested in October from plants that are at least six years old, they are then dried for later use[4]. A homeopathic remedy is prepared from the dried root[232]. This is used especially in the treatment of diarrhoea in teething children[232].

nrakta Europe to E. Asia - Siberia. ksacta Wet mountain rocks in Europe[50].

propta Seed - best sown in autumn in a shaded cold frame[200]. The seed can also be sown in spring in a cold frame. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse or cold frame for their first winter, planting them out in the spring. Division in early spring or autumn[1, 111]. Divide up the rootstock with a sharp spade or knife, making sure that there is at least one growth bud on each division. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Prefers a deep, fertile, moderately heavy, humus rich, moisture retentive, well-drained soil in sun or semi-shade[200]. Shade tolerant[15], but plants prefer a sunny position[37]. Grows well in heavy clay soils. Hardy to at least -20°C[200]. This species is probably a parent of the cultivated rhubarb, *R. x cultorum*[200]. Plants in this genus seem to be immune to the predations of rabbits[233]. Hybridizes freely with other members of this genus[200].

4.2.139 *Plantago major*

Common Plantain, Cart Track Plantain, White Man's Foot, Plantain
3 tlin 12 cyuc 2 kcaak 3 tcan 3 dwat m hkuc
htut cyutli tcup hwicli hrasjlutnyk hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta *Plantago major* is a PERENNIAL growing to 0.1 m (0ft 4in) by 0.1 m (0ft 4in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to September, and the seeds ripen from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerate maritime exposure.

pocista High doses may cause a fall in blood pressure and diarrhoea. Possible allergic contact dermatitis. Avoid in patients with intestinal obstruction or abdominal discomfort [301].

kcakta Edible Parts: Leaves Root SeedEdible Uses: TeaYoung leaves - raw or cooked[2, 5, 12, 56, 62, 183]. They are rather bitter and tedious to prepare because the fibrous strands need to be removed before use[9]. It is best not to use the leaf-stalk since this is even more fibrous than the leaf[183]. Many people blanch the leaves in boiling water before using them in salads in order to make them more tender[183]. A Chinese form has more palatable leaves - it contains about 2.7% protein, 0.4% fat, 2.2% ash[179]. Seed - raw or cooked[62, 172]. Very tedious to harvest[172]. The seed can be ground into a meal and mixed with flour[183]. It is very rich in vitamin B1[179]. The whole seeds can be boiled and used like sago[193]. The dried leaves make an acceptable tea[183]. Root[183]. No further details.

tcanta Some named forms have been selected for their ornamental value[233]. An important food plant for the caterpillars of many species of butterflies[30]. Special Features: Edible, Naturalizing, Suitable for dried flowers. Dynamic accumulator.

dwatta *Antidote Astringent Demulcent Deobstruent Depurative Diuretic Expectorant Haemostatic Laxative Ophthalmic Poultrice Refrigerant VermifugeCommon plantain* is a safe and effective treatment for bleeding, it quickly staunches blood flow and encourages the repair of damaged tissue[254]. The leaves are astringent, demulcent, deobstruent, depurative, diuretic, expectorant, haemostatic and refrigerant[4, 7, 9, 21, 147, 165, 172, 238]. Internally, they are used in the treatment of a wide range of complaints including diarrhoea, gastritis, peptic ulcers, irritable bowel syndrome, haemorrhage, haemorrhoids, cystitis, bronchitis, catarrh, sinusitis, asthma and hay fever[238, 254]. They are used externally in treating skin inflammations, malignant ulcers, cuts, stings etc[4]. The heated leaves are used as a wet dressing for wounds, swellings etc[213, 222]. The root is a remedy for the bite of rattlesnakes, it is used in equal portions with *Marrubium vulgare*[207]. The seeds are used in the treatment of parasitic worms[213]. Plantain seeds contain up to 30% mucilage which swells up in the gut, acting as a bulk laxative and soothing irritated membranes[238]. Sometimes the seed husks are used without the seeds[238]. A distilled water made from the plant makes an excellent eye lotion[7].

nrakta Most of Europe, including Britain, to northern and central Asia. ksacta A common garden weed, particularly in lawns[1, 4, 13]. Rarely in grassy places[17].

propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in early summer. A sowing can be made outdoors in situ in mid to late spring if you have enough seeds.

nwatta Succeeds in any moderately fertile soil in a sunny position[200]. Although this species is a common garden weed, some named forms have been selected for their ornamental value[233].

4.2.140 *Tanacetum vulgare*

Tansy, Common tansy, Golden Buttons, Curly Leaf Tansy
3 tlin 9 cyuc 2 kcaak 4 tcan 2 dwat 1 m hkuc

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

nwatta Landscape Uses:Border, Screen, Specimen. An easily grown plant, succeeding in most soils[1]. Unlike other members of the genus, this species grows well on poor soils and in dry situations[200]. Prefers a deep rich loamy soil in sun or semi-shade[11, 200]. Best if given shade from the early morning sun in spring[200]. A very hardy plant, tolerating temperatures down to about -40°C[200]. Plants are self-incompatible and need to grow close to a genetically distinct plant in the same species in order to produce fruit and fertile seed[11, 200]. Special Features:Attracts birds, Attractive foliage, North American native, Attracts butterflies, Fragrant flowers, Attractive flowers or blooms.

4.2.121 *Malus angustifolia*

Southern Crab, Southern crab apple
3 tlin 8 cyuc 2 kcaak 0 tcan 0 dwat 7 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnykfrrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Malus angustifolia* is a deciduous Tree growing to 7 m (23ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[61, 105]. A fragrant aroma, but the fruit is harsh preserves, cider, jellies etc[46, 82, 183]. The fruit is about 25mm in diameter and is slightly pear-shaped[200].

tcanta WoodWood - hard, heavy, close grained[46, 61, 82, 229]. It weighs 43lb per cubic foot[235]. Of no commercial value, but it is used locally for making lvers, tool handles and other small objects[46, 61, 82, 229].

nrakta Eastern N. America - Maryland to Florida, west to Texas and Louisiana. ksacta Woods and thickets, especially along river banks[229].

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

nwatta Landscape Uses:Border, Specimen. An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[1, 200]. The flowers have a perfume of violets[245]. A short-lived tree in the wild[229]. The fruit is a good wildlife

food source, especially for birds[200]. Hybridizes freely with other members of this genus[200]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features:North American native, Fragrant flowers, Attractive flowers or blooms.

4.2.122 *Malus x astracanica*

3 tlin 7 cyuc 2 kcaak 0 tcan 0 dwat 5 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnykfrrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Malus x astracanica* is a deciduous Tree growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105].

nrakta A garden hybrid, *M. prunifolia* x *M. pumila*[177]. ksacta Not known in the wild.

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

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[1, 200]. This hybrid species is possibly a primitive form of the cultivated apple[11]. The fruit is a good wildlife food source, especially for birds[200]. Hybridizes freely with other members of this genus[200]. Plants in this genus are notably susceptible to honey fungus[200].

4.2.123 *Zanthoxylum americanum*

Prickly Ash - Northern, Common pricklyash, Northern Prickly Ash
3 tlin 7 cyuc 2 kcaak 2 tcan 3 dwat 4 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyk hpa7tli flatprikliwis hpa7tmwatli nyanhjen hjonli

drutta *Zanthoxylum americanum* is a deciduous Shrub growing to 4 m (13ft) by 4 m (13ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from May to June, and the seeds ripen from September to October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). . The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Tannins may reduce gut iron absorption. Possible nervous system stimulation. Excessive ingestion may interfere with anticoagulant therapy [301].

kcakta Edible Parts: Edible Uses: CondimentSeed - cooked. It is used as a condiment. A pepper substitute[106]. The fruit is rather small, about 4 - 5m in diameter[229], but is produced in dense clusters which makes harvesting easy[K]. Each fruit contains a single seed[229].

tcanta EssentialAgroforestry Uses: The plant's prickly nature and suckering habit can produce an effective barrier[277] . Other Uses: The fruits have been used by young men as a perfume[257] . Wood - soft. It weighs 35lb per cubic foot[235] . Of little use[229] .

dwatta Anodyne Antirheumatic Antispasmodic Carminative Diaphoretic Diuretic Dysentery Irritant Odontalgic Sialagogue Skin StimulantPrickly ash is a warming, stimulating herb that is beneficial for the circulation. It was highly regarded by the native North American Indians who used it especially to alleviate rheumatism and toothache[254]. All parts of the plant, but especially the bark and roots, contain the aromatic bitter oil xanthoxylin[229]. This has a number of applications in medicine, especially in the treatment of arthritic and rheumatic conditions, digestive problems and leg ulcers[229, 254]. The fruit has a similar medicinal action to the bark[4]. The bark and roots are irritant, odontalgic and antirheumatic[213]. Along with the fruit they are diaphoretic, stimulant and a useful tonic in debilitated conditions of the stomach and digestive organs[4]. They produce arterial excitement and are of use in the treatment of fevers, ague, poor circulation etc[4]. The fruits are considered more active than the bark, they are also antispasmodic, carminative, diuretic and antirheumatic[4, 213, 222]. The pulverized root and bark are used to ease the pain of toothache[213, 222]. One report says that it is very efficacious, but the sensation of the acrid bark is fully as unpleasant as the toothache[213]. Chewing the bark induces copious salivation[222]. Rubbing the fruit against the skin, especially on the lips or in the mouth, produces a numbing effect[K]. A tea or tincture of the bark has been used in the treatment of rheumatism, dyspepsia, dysentery, heart and kidney troubles etc[222]. A tea made from the inner bark has been used to treat itchy skin[213, 257].

nrakta Eastern N. America - Quebec to Florida, west to Minnesota and Oklahoma. ksacta Found on upland rocky hill-sides and on moist low-lying sites, in open woods, on bluffs or in thickets[229].

propta Seed - best sown in a greenhouse as soon as it is ripe in the autumn. Stored seed may require up to 3 months cold stratification, though scarification may also help[113]. Sow stored seed in a cold frame as early in the year as possible. Germination should take place in late spring, though it might take another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant them out in early summer. Cuttings of half-ripe wood, July/August in a frame. Root cuttings, 3cm long, planted horizontally in pots in a greenhouse. Good percentage[78]. Suckers, removed in late winter and planted into their permanent positions[113].

nwatta Landscape Uses:Border, Massing. Prefers a good deep well-drained moisture retentive soil in full sun or semi-shade[1, 11, 200]. A relatively fast-growing plant in the wild, it often forms thickets by means of root suckers[229]. All parts of the plant are fragrant. The bruised foliage has a delicious resinous orange-like perfume[245]. Dioecious. Male and female plants must be grown if seed is required. Flowers are formed on the old wood[206]. Special Features:North American native, Attracts butterflies, Inconspicuous flowers or blooms, Blooms appear periodically throughout the year. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A sprouting standard sending up shoots from the base [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

4.2.124 Amelasorbus jackii

Jack's amelasorbus
3 tlin 7 cyuc 2 kcaak 0 tcan 0 dwat 2 m hkuc

hmimhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Amelasorbus jackii is a deciduous Shrub growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. Not very palatable[183].

nrakta Western N. America - Idaho and Oregon. ksacta Not known

propta Seed - it is best harvested 'green', when the seed is fully formed but before the seed coat has hardened, and then sown immediately in pots outdoors or in a cold frame. If stored seed is obtained early enough in the autumn, it can be given 4 weeks warm stratification before being left out in the winter and it should then germinate in the spring. Otherwise seed can be very slow to germinate, perhaps taking 18 months or more. When large enough to handle, prick the seedlings out into individual pots and grow them on in a sheltered outdoor position, planting them out once they are 20cm or more tall. This is a bi-generic hybrid and, if seed is produced, it is unlikely to breed true. If there is sufficient seed it is best to sow it thinly in an outdoor seedbed[78, 80]. Grow the seedlings on for two years in the seedbed before planting them out into their permanent positions during the winter. Layering in spring - takes 18 months[78]. Division of suckers in late winter. The suckers need to have been growing for 2 years before you dig them up, otherwise they will not have formed roots. They can be planted out straight into their permanent positions if required.

nwatta Prefers a sunny position in a well-drained moisture-retentive humus-rich lime-free soil[200]. This species probably tolerates some lime in the soil[200].Succeeds in semi-shade though it fruits less well in such a position[200]. Hardy to about -20°C[200]. Plants are surprisingly vigorous in British gardens[11]. A naturally occurring bi-generic hybrid, Amelanchier alnifolia semiintegrifolia x Sorbus scopulina, it is very variable in the wild[182, 200].

4.2.125 Eleutherococcus senticosus

Siberian Ginseng

3 tlin 7 cyuc 2 kcaak 0 tcan 5 dwat 2 m hkuc
hmimhtut cyutli tcup hwicli hyishrasljutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Eleutherococcus senticosus is a deciduous Shrub growing to 2 m (6ft 7in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. It can tolerate atmospheric pollution.

pcista Caution if high blood pressure. Avoid coffee. 6 weeks maximum use. Avoid during pregnancy. Unsuitable for children. High doses may cause drowsiness, anxiety, irritability, mastalgia and uterine bleeding. Possible blood pressure increases and irregular heart beats. Effects of anti-diabetic drugs, sedatives and anticoagulants may be potentiated [301]

kcakta Edible Parts: LeavesEdible Uses: TeaYoung leaves and buds - cooked[105, 177]. The dried leaves are used as a tea substitute[105, 177].

dwatta Adaptogen Antiinflammatory Hypoglycaemic Tonic VasodilatorSiberian ginseng is a powerful tonic herb with an impressive range of health benefits. Unlike many herbs with a medicinal use, it is more useful for maintaining good health rather than treating ill health. Research has shown that it stimulates resistance to stress and so it is now widely used as a tonic in times of stress and pressure[254]. This plant is a very commonly used folk treatment in China and Russia where it is used as a ginseng substitute[218]. It is a pungent bitter-sweet warming herb that

nrakta Eastern N. America - Nova Scotia and New Brunswick to Ontario, Minnesota, Georgia and Missouri. ksacta Woods and thickets[235].

propta Seed - surface sow in spring in a cold frame. Do not allow the compost to become dry. Pre-chilling the seed for two weeks can improve germination rates[134]. The seed usually germinates in 2 weeks at 20°C[134]. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn[200]. Basal cuttings in late spring. Harvest the shoots when they are about 10 - 15cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Succeeds in most good garden soils[1], preferring one that is well-drained and moisture retentive[200]. Prefers a sunny position[200]. Prefers a rich soil[1]. Plants can be naturalized in a woodland or other wild garden[200]. Most species in this genus seem to be immune to the predations of rabbits[233]. Hybridizes freely with other members of this genus[200].

4.2.136 Anchusa azurea

Anchusa, Italian bugloss

3 tlin 7 cyuc 2 kcaak 0 tcan 1 dwat 1.5 m hkuc
htut cyutli hgattcup hwicli hrasljutnyikfrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Anchusa azurea is a PERENNIAL growing to 1.5 m (5ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from June to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil and can tolerate drought.

kcakta Edible Parts: Flowers LeavesEdible Uses: Flowers - raw. An excellent and decorative addition to the salad bowl, or used as a garnish[183]. The tender young leaves and young flowering shoots can be cooked and eaten as a vegetable[7].

tcanta DyeA red dye is obtained from the root[7]. This was at one time used as a basis for some cosmetics[7].

dwatta Antitussive Depurative Diaphoretic Diuretic PoulitceThe whole plant is antitussive, depurative, diaphoretic and diuretic[7]. It is harvested when in flower and dried for later use. The dried and powdered herb is used as a poultice to treat inflammations[7]. Use internally with caution, the plant contains the alkaloid cynoglossine which can have a paralyzing effect[7].

nrakta Europe - Caucasus. An occasional garden escape in Britain[17]. ksacta Sides of arable fields, waste places, roadsides and steppes on stony hills[45, 187].

propta Seed - sow spring in pots of sandy soil[200]. An overnight drop in temperature helps germination[133]. The seed usually germinates in 1 - 4 weeks at 21°C[133]. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in early spring[200]. Root cuttings in autumn or early winter. Late winter is best[200].

nwatta Succeeds in most soils, preferring a sunny position[1, 111]. Prefers a fertile well-drained soil[111]. Tolerates heavy clay[200]. Requires a deep well-drained soil[187]. Established plants tolerate drought[187]. Plants are hardy to about -15°C[187]. The flowers are a good source of food for bees[1]. Many named forms have been selected for their ornamental value[187]. The plants tend to be short-lived perennials but they can be propagated by means of root cuttings[187].

4.2.137 Lythrum salicaria

Purple Loosetrife

3 tlin 10 cyuc 2 kcaak 0 tcan 3 dwat 1 m hkuc
hmimhtut cyutli tcuphja7nh56s hwicli hrasljutnyikfrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Lythrum salicaria is a PERENNIAL growing to 1 m (3ft 3in) by 0.5 m (1ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from June to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can grow in water.

kcakta Edible Parts: Leaves RootEdible Uses: ColouringLeaves - cooked[13, 46, 61, 105]. Rich in calcium[179]. Root - cooked[13]. An edible dye is obtained from the flowers[13].

tcanta Cosmetic Dye Preservative Tannin TeethA decoction of the plant is impregnated into wood, rope etc to prevent it rotting in water[74]. The leaves contain about 12% tannin, the stems 10.5%, the flowers 13.7% and the roots 8.5%[218]. It is probably these tannins that preserve the wood etc[218]. The powdered plant is used cosmetically in face-packs to counteract reddened skin[7].

dwatta Antibiotic Antidiarrhoeal Astringent Dysentery Eczema Hypoglycaemic Styptic VulneryPurple loosetrife is an astringent herb that is mainly employed as a treatment for diarrhoea and dysentery. It can be safely taken by people of all ages and has been used to help arrest diarrhoea in breast-feeding babies[254]. It can also be used to treat heavy periods and inter-menstrual bleeding[254]. Modern research has shown the whole plant to be antibiotic and to be particularly effective against the micro-organism that causes typhus[254]. The flowering plant is antibiotic, highly astringent, hypoglycaemic, styptic and vulnerary[4, 7, 9, 21, 152, 218, 238]. It is valued as an intestinal disinfectant, especially in cases of enteritis[7], an infusion is used internally in the treatment of diarrhoea, internal bleeding, excessive menstruation etc[9, 222, 238]. The flowering plant is harvested in the summer and can be used fresh or dried[9]. Externally, the plant is used as a cleansing and healing wash for wounds, sores, impetigo, eczema, excess vaginal discharge, vaginal itching etc[7, 222, 238, 254]. The powdered plant is used as a haemostatic in cases of severe nosebleeds[7]. The stems are regarded as gum stimulators and are given to children to chew in order to strengthen weak or bleeding gums[7].

nrakta Europe, including Britain, south to N. Africa east to western and northern Asia. N. America.. ksacta Reed swamps at the margins of lakes and slow-flowing rivers, fens and marshes, avoiding acid soils[17].

propta Seed - sow in the autumn or the spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. If you have sufficient seed it could be worthwhile trying a sowing in situ in the autumn or the spring. Division in March or October[188]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring. Basal cuttings in the spring[238]. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Landscape Uses:Container, Massing, Rock garden, Seashore, Specimen. Succeeds in ordinary garden soil, especially if it is damp[1]. Prefers a neutral to alkaline soil[238]. Grows well in heavy clay soils. Grows well in marshy soils[24] and succeeds in shallow water at the edges of ponds[56]. Succeeds in full sun or partial shade[188]. A very hardy plant, tolerating temperatures down to at least -25°C[187]. This species can be very invasive and has been declared a noxious weed in some countries. Since being introduced in N. America it has invaded native marshlands, forming large areas of dense stands and crowding out many native species[274]. A very ornamental plant[1]. A good bee and butterfly plant[24]. Plants usually self-sow when well sited[200]. Special Features:Invasive, Naturalizing, Attracts butterflies, Suitable for cut flowers. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [2-1].

scabra (‘rough’) have gained the Royal Horticultural Society’s Award of Garden Merit: ‘Benzinggold’, ‘Light of London’, ‘Spitzentänzerin’, ‘Waterperry Gold’.

4.2.133 *Quercus mongolica grosseserrata*

3 tlin 7 cyuc 2 kcaok 0 tcan 2 dwat m hkuc hmimhtut cyutli tcup hwicli jltunyk hpa7tli flatprikliwis hpa7tmwatli hjonli

drutta *Quercus mongolica grosseserrata* is a deciduous Tree growing to 20 m (65ft) by 15 m (49ft). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: CoffeeSeed - cooked. It can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed contains bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute.

tcanta Repellent Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as they can inhibit plant growth[20]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. Wood - hard, easily worked. Used for furniture, panelling, furniture etc[46].

dwatta Astringent DysenteryAny galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta E. Asia - Japan. ksacta Mountains all over Japan[58].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Lime tolerant[188]. Young plants tolerate reasonable levels of shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. Prefers warmer summers than are usually experienced in Britain, trees often grow poorly in this country and fail to properly ripen their wood resulting in frost damage overwinter[200]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200].

4.2.134 *Sambucus mexicana*

Mexican Elder
3 tlin 9 cyuc 2 kcaok 0 tcan 1 dwat m hkuc hmimhtut cyutli tcup hwicli hrasljutnyk hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Sambucus mexicana* is a deciduous Shrub growing to 1 m (3ft 3in). It is in flower from May to June. The

species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

pcista Although no specific mention has been seen for this species, the leaves and stems of some, if not all, members of this genus are poisonous[9, 76]. The fruit of many species (although no records have been seen for this species) has been known to cause stomach upsets to some people. Any toxin the fruit might contain is liable to be of very low toxicity and is destroyed when the fruit is cooked[65, 76].

kcakta Edible Parts: Flowers FruitEdible Uses: Flowers - raw or cooked[183]. Fruit - raw or cooked[257]. It is usually dried before being used since this reduces a somewhat rank taste[177, 181, 183]. The fruit can be used in making pies, preserves, winemaking etc[183]. The fruit is about 6mm in diameter and is borne in large clusters[227]. Some caution is advised, see the notes above on toxicity.

tcanta Dye WoodA purple to black dye is obtained from the fruits[257]. An orange to yellow dye is obtained from the stems[257]. Wood - soft and coarse-grained[227].

dwatta Febrifuge Laxative StomachicAn infusion of the blossoms has been used in the treatment of upset stomachs, fevers, sore throats, colds and flu[257]. A decoction of the roots has been used in the treatment of constipation[257].

nrakta South-western N. America - California to New Mexico, south to Mexico. ksacta Open flats and cismontane valleys and canyons below 1850 metres in California[71]. Oak forests along streams and ditches, 1800 - 3000 metres in Mexico[181].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame, when it should germinate in early spring. Stored seed can be sown in the spring in a cold frame but will probably germinate better if it is given 2 months warm followed by 2 months cold stratification first[78, 98, 113]. Prick out the seedlings into individual pots when they are large enough to handle. If good growth is made, the young plants can be placed in their permanent positions during the early summer. Otherwise, either put them in a sheltered nursery bed, or keep them in their pots in a sheltered position and plant them out in spring of the following year. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame[78]. Cuttings of mature wood of the current season’s growth 15 - 20cm with a heel, late autumn in a frame or a sheltered outdoor bed[78].

nwatta We have very little information on this species and do not know if it will be hardy in Britain, though judging by its native range it should succeed outdoors in many parts of this country. It is closely related to *S. caerulea*[71]. The following notes are based on the general needs of the genus. Tolerates most soils, including chalk[200], but prefers a moist loamy soil[11, 200]. Grows well in heavy clay soils. Tolerates some shade but is best in a sunny position[1]. Tolerates atmospheric pollution and coastal situations[200]. Plants in this genus are notably resistant to honey fungus[200].

4.2.135 *Aster cordifolius*

Common Blue Wood Aster
3 tlin 7 cyuc 2 kcaok 2 tcan 1 dwat 1.5 m hkuc htut cyutli tcup hwicli hrasljutnyk hpa7tli flatprikliwis hpa7tmwatli fyfxfre7t hjonli

drutta *Aster cordifolius* is a PERENNIAL growing to 1.5 m (5ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles, Lepidoptera (Moths and Butterflies). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves - cooked and used as greens[207].

dwatta Antirheumatic Aromatic NerveineAn infusion of the plant is used as an aromatic nerveine and also in the treatment of rheumatism[207].

is said to be stronger in its action than ginseng[238]. Regular use is said to restore vigour, improve the memory and increase longevity[218]. The root and the root bark are adaptogen, anti-inflammatory, hypoglycaemic, tonic and vasodilator. It is taken internally during convalescence and in the treatment of menopausal problems, geriatric debility, physical and mental stress etc[238]. It works by strengthening the bodies natural immune system[140, 165, 176, 238]. It has also been used to combat radiation sickness and exposure to toxic chemicals[200, 218, 238]. This herb is not prescribed for children, and should not be used for more than 3 weeks at one time[238]. Caffeine should not be taken when using this herb[238]. The roots are harvested in the autumn and dried for later use[238]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve *Eleutherococcus senticosus* for tendency to infection, lack of stamina (see [302] for critics of commission E).

nrakta E. Asia - China, Japan, Siberia. ksacta Mixed and coniferous mountain forests, forming small undergrowth or groups in thickets and edges. Sometimes found in oak groves at the foot of cliffs, very rarely in high forest riparian woodland[74].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame[200]. It can be slow to germinate. Stored seed requires 6 months warm followed by 3 months cold stratification[113] and can be very slow to germinate[133]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for at least the first winter. Plant out in late spring or early summer. Cuttings of half-ripe wood, July/August in a frame[113, 200]. Cuttings of ripe wood of the current season’s growth, 15 - 30cm long in a cold frame[238]. Root cuttings in late winter[200]. Division of suckers in the dormant season[200].

nwatta Prefers a light warm open loamy humus-rich soil and a position sheltered from north and east winds[11, 200]. Prefers a well-drained soil and full sun[200]. (A surprising report, this species is a woodland plant and we would expect it to prefer shade[K]) Tolerates urban pollution and poor soils[200]. Plants are hardy to at least -15°C if they are sheltered from cold winds[200]. A highly polymorphic species[74]. Siberian ginseng is cultivated as a medicinal plant in Russia and China[140].

4.2.126 *Cotoneaster racemiflorus*

Black-Wood, Cotoneaster
3 tlin 7 cyuc 2 kcaok 2 tcan 1 dwat 2.4 m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasljutnyk hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Cotoneaster racemiflorus* is a deciduous Shrub growing to 2.4 m (7ft 10in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies, midges. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: MannaEdible Uses: Yields a manna-like substance called shir-khist, it is rich in sugars[46, 61, 183]. It contains about 13% sacchrose, 37.5% dextrose[105, 183]. No details of which part of the plant yields the manna, it is most likely to be the stem.

tcanta Basketry Dye WoodA rose-tan dye is obtained from the fruit[168]. The wood is used in basket making.

dwatta Aperient Expectorant StomachicThe plant is aperient, expectorant and stomachic[240].

nrakta N. Africa to W. and C. Asia. ksacta Shrubby thickets on stony slopes[74]. To elevations of 2400 metres in Kashmir[143].

propta Seed. Members of this genus hybridize freely so, if you require seed that breeds true, it is important to obtain it from a known wild source or from a controlled fertilization of garden plants. The seed is best sown as soon as it is ripe in the autumn in a cold frame, when it will usually germinate in the spring[11, 200]. Stored seed germinates faster if

given 3 months warm stratification at 15°C and then 3 months cold stratification at 4°C[164]. The seed usually germinates within 1 - 18 months at 15°C but it can take 2 years[164]. Pot the seedlings up as soon as they are large enough to handle and plant them out into nursery beds or into their permanent positions when they are more than 10cm tall. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200]. Cuttings of mature wood of the current year’s growth, preferably with a heel, November in a frame.

nwatta An easily grown plant, it prefers a good soil but also does well in poor soils[1, 11, 200]. It thrives in lime and is also happy in peaty soils[1]. It succeeds in any soil that is not marshy or waterlogged[11, 200]. Succeeds in dry soils[188]. Grows well in heavy clay soils. Succeeds in full sun or semi-shade but does not fruit so freely in a shady position[11, 200]. Tolerates atmospheric pollution[200]. A very hardy plant, tolerating temperatures down to about -25°C[200]. Hybridizes freely with other members of this genus[200]. There are several sub-species[200]. The flowers, when inhaled near to, have an unpleasant smell like decaying fish[245]. They are very attractive to bees whilst the fruit is a good winter food source for many species of birds[200]. Trees are notably susceptible to honey fungus[200]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

4.2.127 *Aruncus dioicus*

Goat’s Beard, Bride’s feathers
3 tlin 7 cyuc 2 kcaok 0 tcan 2 dwat 2 m hkuc hmimhtut cyutli kyuctcuphja7n hwicli hrasljutnyk hpa7tli frusflatprikliwis hpa7tmwatli nyanhjen hjonli

drutta *Aruncus dioicus* is a PERENNIAL growing to 2 m (6ft) by 3 m (9ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from June to August. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry moist or wet soil.

pcista Cyanogenic glycosides are found in the leaves[74].

kcakta Edible Parts: LeavesEdible Uses: Budlings, stems and young leaves - cooked[177]. Some caution is advised, see the notes above on toxicity.

tcanta Plants form a dense growth that is very effective at holding invasive plants at bay[208]. They can be used as a tall ground cover for large areas[208].

dwatta Antipyretic Astringent Birthing aid Salve Stings Stomachic VDThe poulticed root is applied to bee stings[222, 257]. A tea made from the roots is used to allay bleeding after child birth, to reduce profuse urination and to treat stomach pains, diarrhoea, gonorrhoea, fevers and internal bleeding[222, 257]. The tea is used externally to bathe swollen feet and rheumatic joints[222, 257]. A salve made from the root ashes is rubbed onto sores[257].

nrakta Europe, N. America and Asia. ksacta Damp woods, shady places and by streams, usually in mountainous areas[50, 187].

propta Seed - best sown in a cold frame as soon as it is ripe. Sow stored seed in late winter or early spring in a cold frame. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame until they are at least 15cm tall. They can be planted out into their permanent positions at any time of the year. Division in early spring or autumn[200]. Very easy, the clumps can be planted out direct into their permanent positions.

nwatta Landscape Uses:Border, Massing, Seashore, Specimen, Woodland garden. Succeeds in most moist soils in sun or partial shade[187, 200, 233]. Plants do well in moist to wet soils but will also tolerate fairly dry sites[208]. Succeeds in acid or limey soils[208]. Grows well on the woodland edge[200]. Plants can be grown in quite coarse grass,

which can be cut annually in the autumn[233]. Plants are hardy to at least -20°c[187]. This is a polymorphic species, especially the form that grows in Japan[187]. There are some named forms selected for their ornamental value. 'Kneiffii' is only half the size of the type species[208]. Plants are fast-growing[208] and form very large clumps[187]. The flowers are sweetly perfumed[245]. Dioecious, male and female plants must be grown if seed is required[208]. Special Features:Attractive foliage, Naturalizing, Wetlands plant.

4.2.128 Filipendula kamschatica

3 tlin 7 cyuc 2 kcaak 0 tcan 0 dwat 2 m hkuc
hmmhtut cyutli tucphja7n hwicli hrasljutnyikfrip hpa7tli prikwlis hpa7tmwatli fyfxre7t hjonli

drutta Filipendula kamschatica is a PERENNIAL growing to 2 m (6ft) by 2 m (6ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

ksakta Edible Parts: Leaves RootEdible Uses: Young shoots - raw[74]. Leaves - cooked[74]. Root - raw or cooked[74].

nrakta E. Asia - Japan, Siberia. ksacta High grass meadows[74] along streams in the mountains[187].

propta Seed - best sown in the autumn in a cold frame[1]. The seed can also be sown in a cold frame in spring, germinating best at a temperature of 10 - 13°c[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer if they have grown enough. If not, keep them in a cold frame for the winter and plant them out in late spring. Division in autumn or winter[188, 200]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to put up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Requires a humus-rich moist soil in semi-shade[1, 200]. Succeeds in full sun only if the soil is reliably moist throughout the growing season[200]. Dislikes dry or acid soils. Does well in marshy soils. Grows well in heavy clay soils. Plants are hardy to about -25°c[187], when growing in shallow water they even survive if the water is frozen[245]. A good bee plant, the flowers also attract flies. The flowers have a powerful, sweet scent when inhaled from a distance, though there are fishy undertones when inhaled near to[245]. Members of this genus are rarely if ever troubled by browsing deer[233].

4.2.129 Equisetum hyemale

Dutch Rush, Scouringrush horsetail, Horsetail, Scouring Rush, Rough Horsetail

3 tlin 11 cyuc 2 kcaak 3 tcan 2 dwat 1 m hkuc
hmmhtut cyutli tucp hwicli hrasljutnyik hpa7tli flatprikwlis hpa7tmwatli hjonli

drutta Equisetum hyemale is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5. The seeds ripen from July to August. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcasta Large quantities of the plant can be toxic. This is because it contains the enzyme thiaminase[172], a substance that can rob the body of the vitamin B complex[65]. In small quantities this enzyme will do no harm to people eating an adequate diet that is rich in vitamin B, though large quantities can cause severe health problems. The enzyme is destroyed by heat or thorough drying, so cooking the plant will remove the thiaminase[172]. The plant also contains equisetin acid - see the notes on medicinal uses for more information[213].

ksakta Edible Parts: Root StemEdible Uses: Strobil (the fertile shoots in spring) - cooked[177]. An asparagus substitute. Caution is advised, see the notes above on toxicity. Roots - dried and then cooked[257]. A source of starch[177].

Caution is advised, see the notes above on toxicity. A further report says that the peeled stems, base of the plant, root and tubers were eaten raw by the N. American Indians, the report went on to say that this may be inadvisable[85].

tcanta Dye Fungicide Liquid feed Musical Paper Parasiticide Polish Sandpaper ScourerThe stems are very rich in silica[4]. They are used for scouring and polishing metal[1, 4, 46, 61, 99] and as a fine sandpaper[54, 99]. The stems are first bleached by repeated wetting and drying in the sun[74]. They can also be used as a polish for wooden floors and furniture[46, 178]. The infused stem is an effective fungicide against mildew, mint rust and blackspot on roses[14]. It also makes a good liquid feed[54]. Used as a hair rinse it can eliminate fleas, lice and mites[213, 257]. A light pink dye is obtained from the stem[99]. The hollow stems have been used as whistles[257]. Another report says that the stem joints are pulled apart and used by children to produce a whistling sound[257].

dwatta Antibacterial Antiinflammatory Antispasmodic Appetizer Cancer Diaphoretic Diuretic Expectorant Febrifuge Hypotensive Parasiticide StypticHorsetails have an unusual chemistry compared to most other plants[238]. They are rich in silica, contain several alkaloids (including nicotine) and various minerals[238, 279]. The plant is anticancer, anti-inflammatory, antispasmodic, diaphoretic, diuretic, expectorant, febrifuge, haemostatic, hypotensive and styptic[147, 176, 218, 279]. It also has an appetite-stimulating effect[279]. The barren stems are used, they are most active when fresh but can also be dried and sometimes the ashes of the pant are used[4]. The plant is a useful diuretic when taken internally and is used in the treatment of kidney and bladder problems[4]. A decoction applied externally will stop the bleeding of wounds and promote healing[4]. The plant contains polyphenolic flavonoids with bactericidal activity[218].

nrakta Temperate regions of Europe, including Britain, N. America and Asia. ksacta Shady streambanks etc, to 500 metres[17].

propta Spores - best collected as soon as they are ripe in the spring and surface-sown immediately on a sterile compost. Keep moist and pot up as soon as the plants are large enough to handle. Very difficult[200]. Division. The plants usually spread very freely when well sited and should not really need any assistance.

nwatta Landscape Uses:Container, Ground cover, Woodland garden. Prefers a moist soil with a pH between 6.5 and 7.5[200]. Plants are hardy to about -30°c[200]. The stems of this species were once exported to Britain in quantity from Holland so that they could be used as an abrasive for cleaning pots and pans[238]. Plants have a deep and penetrating root system and can be invasive. If grown in the garden they are best kept in bounds by planting them in a large container which can be sunk into the ground[200]. Special Features:North American native, Invasive, Naturalizing, Wetlands plant. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fleshy. Thick or swollen - fibrous or tap root [2-1].

4.2.130 Solidago odora

Sweet Goldenrod, Anisescented goldenrod, Chapman's goldenrod

3 tlin 7 cyuc 2 kcaak 2 tcan 2 dwat 1.2 m hkuc
hmmhtut cyutli kyuctcup hwicli hyishrasljutnyikfrip hpa7tli flatprikwlis hpa7tmwatli xre7t hjonli

drutta Solidago odora is a PERENNIAL growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

ksakta Edible Parts: Leaves SeedEdible Uses: Condiment TeaLeaves - cooked[177]. Seed[177]. No more details are given but the seed is very small and fiddly to harvest[K]. An aromatic, anise-flavoured tea is made from the

dried leaves and dried fully expanded flowers[21, 55, 95, 183]. The blossoms are used as a flavouring[102].

tcanta Dye EssentialAn anise-scented essential oil is obtained from the plant[61]. It is used medicinally[207] and in perfumery - especially for scenting soaps[245]. Mustard, orange and brown dyes can be obtained from the whole plant[168].

dwatta Antiseptic Aperient Astringent Carminative Diaphoretic Diuretic Dysentery Febrifuge Stimulant Tonic UrinaryAn infusion of the dried powdered herb is antiseptic[168]. The leaves make a very pleasant-tasting tea that is mildly astringent, carminative, diaphoretic, diuretic, febrifuge and stimulant[21, 95, 207, 222, 257]. It is useful in the treatment of coughs and colds, dysentery and ulceration of the intestines[4, 257]. The essential oil has been used as a diuretic for infants, as a local application for headaches and for the treatment of flatulence and vomiting[4]. The flowers are aperient, astringent and tonic[4]. An infusion is beneficial in the treatment of gravel, urinary obstruction and simple dropsy[4]. The root can be chewed as a treatment for sore mouths[257].

nrakta Eastern N. America - New Hampshire to Florida, west to Texas and Oklahoma. ksacta Dry sterile soil or thin woodlands[43]. Woods and roadsides in Texas[274].

propta Seed - sow spring in a cold frame. Only just cover the seed and do not allow the compost to become dry. Prick out the seedlings into individual pots when they are large enough to handle, and grow them on for their first winter in pots. Plant them out into their permanent positions in spring or early summer. Division in spring or autumn. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Succeeds in any moderately fertile moisture retentive soil in sun or semi-shade[200]. Tolerant of very poor sandy soils[200]. Grows well in heavy clay soils. A rather greedy plant, it is apt to impoverish the soil[1]. The bruised leaves have a smell like a mixture of sassafras and aniseed[245]. The plant attracts various beneficial insects such as ladybirds, lacewings and hoverflies to the garden, these insects will help to control insect pests in the garden[201, 238]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2].

4.2.131 Secale cereale ancestrale

Rye
3 tlin 7 cyuc 2 kcaak 0 tcan 0 dwat m hkuc
htut cyutli hgattcup hwicli hrasljutnyik hpa7tli flatprikwlis hpa7tmwatli xre7t hjonli

drutta Secale cereale ancestrale is a ANNUAL. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil and can tolerate drought.

ksakta Edible Parts: SeedEdible Uses: Seed - cooked[105, 177]. It can be ground into a flour and used as a cereal in making bread, biscuits etc.

nrakta W. Asia. ksacta Sandy places in vineyards, field edges etc, 100 - 1370 metres in Turkey[93].

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

nwatta We have very little information on this species and do not know if it will succeed in Britain, though it should succeed as a spring-sown annual and possibly as an autumn sown plant. It is a primitive form of the cultivated cereal rye, Secale cereale[177] and as such could be of value in breeding programmes. The following notes are based on the general needs of the genus. Succeeds in most soils but prefers a well-drained light soil in a sunny position.

4.2.132 Heliopsis helianthoides

False sunflower, Oxeye sunflower
3 tlin 9 cyuc 2 kcaak 2 tcan 0 dwat 1.5 m hkuc
hmmhtut cyutli hgattcup hwicli hrasljutnyikfrip hpa7tli flatprikwlis hpa7tmwatli hjonli

drutta Heliopsis helianthoides is a PERENNIAL growing to 1.5 m (5ft) by 1.2 m (4ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. The flowers are pollinated by Bees, Insects, Birds. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

ksakta Edible Parts: FlowersEdible Uses: The flowers have a mild taste and can be used as a garnish or in a salad [318-1].

tcanta Soil stabilizationPossibly used for erosion control due to the fibrous deep roots. Insectory: The nectar and pollen of the flowers attract their fair share of insects, including long-tongued bees, Halictine bees, bee flies, butterflies, Chauliognathus pennsylvanicus (Goldenrod Soldier Beetle), and other insects. Among the long-tongued bees, is the oligolege Holcopistes heliopsis (False Sunflower Bee). The caterpillars of Papaipoma rigida (Rigid Sunflower Borer Moth) sometimes bore through the stems[318-1]. Attracts birds and painted lady butterflies. Plant communities- Thickets Selected cultivars are shorter and attractive in a more formal garden. Smooth oxeye is considered one of the best hardy plants for a wildflower garden border [318-1].

dwatta Febrifuge MalariaOx-eye has been used in medicinal drinks, for treatment of lung troubles. The leaves have been used in a strong tea to reduce fevers and loosen phlegm. Stems have been used to treat malaria [318-1].

nrakta Native to eastern and central North America from Saskatchewan east to Newfoundland and south as far as Texas, New Mexico, and Georgia. ksacta Open woods, woodland borders and clearings, thickets, grassy meadows, savannas, limestone glades, tallgrass prairies, blackland prairies, stream banks and disturbed roadsides or railroad rights of way.

propta Seed, Cuttings, Division. Heliopsis helianthoides establishes readily from seed when planted in the winter/fall or early in spring (March to April). Germination generally starts four weeks after sowing if soil temperatures remain in the 60 - 70 degree Fahrenheit range. Seeds ripen approximately one month after flowering, however as with many Asters, plants are self sterile. It may be necessary to crack open a few seeds to make sure they are viable. Cuttings and Divisions: Five to seven node cuttings taken from the top 12 inches of growth in late spring root easily. Cuttings are sometimes reluctant to overwinter. Divide plants in the fall for best results [318-1].

nwatta An upright clumping perennial wildflower with sunflower-like heads. It performs well in dry (xeric) locations, in poor to average soils, and in full sun to partial shade. Flowering can be extended by removing spent flowers. Staking may be necessary in shady locations[318-1]. USDA Hardiness Zones: 3 - 9. Soil pH: 6.0 - 8.0. Growth Rate: Moderate. Life Span: Short-Lived Perennial. Stand Persistence: Long. Form: Upright. Texture: Coarse. Sun: Full Sun, Partial Shade. Soil Type: Loamy, Silty, Clay. Soil Moisture: Moderate, Dry. Minimum Root Depth: 12 inches. Root Type: Tap, Stolon. Fungal Types: Endomycorrhizal. Seasonal Interest: Summer. Fruit Type: Achene. Flower Color: Yellow. Drought: Tolerant. Flood: Moderate. Salt: Moderate. Soil Compaction: Moderate. Mowing: Tolerant. Fire Damage: Tolerant. Cold Injury: Infrequent. Wind Storm Damage: Infrequent. Disease Issues: Minor. Insect/Pest Damage: Minor. Animal Damage: Deer, Gophers, Mice, Rabbits. Growing Season: Warm. Bloom Time: Early Summer - Late Summer. Fruit Time: Summer - Fall [318-1]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. Several cultivars are available with flowers of varying colors and shades. These include 'Summer Sun', 'Golden Plume', and 'Prairie Sunset'. The following cultivars of H. helianthoides var.

diaphoretic and stimulant[213, 257]. The inner bark was boiled and the solution used as an enema[213] and this solution was also used as a tea to reduce fevers, treat influenza, diarrhoea, headaches, voice loss etc[213, 257]. It was used as a wash for the eyes[257]. A compound infusion of the bark and roots has been used to treat childhood diseases such as measles and worms[257]. It has also been used as a wash on areas of the body affected by venereal disease[257]. A poultice of the powdered bark has been used to treat swellings, blisters etc[257].

nrakta Eastern N. America - Newfoundland to Florida, west to Manitoba and Arkansas. ksacta Dry woods and rocky slopes[43]. Rich woodlands and forest margins in moist well-drained soils[82].

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

nwatta Landscape Uses:Specimen, Woodland garden. An easily grown plant, it succeeds in any soil of good or moderate fertility[1], ranging from acid to shallow chalk[200]. Grows well in heavy clay soils and in dry soils. Succeeds in full sun or light shade[188]. Plants are hardy to about -25°C[184]. A fast-growing but short-lived species in the wild[229], it is closely related to *C. controversa*[200]. This species is unusual in having alternate leaves whilst almost all other members of this genus have opposite leaves[182]. Plants have a thin bark and this makes them susceptible to forest fires[229]. There is at least one named form selected for its ornamental value[188]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: Attracts birds, North American native, Attractive flowers or blooms.

4.2.249 Rhamnus cathartica

Common Buckthorn

3 tlin 7 cyuc 0 kcak 0 tcan 3 dwat 6 m hkuc hmimhtut cyutli kyuctup hwicli hrasljutnyik hpa7tli flat-prikilwisslip hpa7tmwatli nyanhjen hjonli

drutta Rhamnus cathartica is a deciduous Shrub growing to 6 m (19ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from May to June, and the seeds ripen in October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Insects. The plant is not self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista The fruit is purgative but not seriously poisonous[186]. Other parts of the plant may also be poisonous[10, 19, 76, 186]. Adverse effects: Diarrhoea, weakness. Urine may turn dark yellow or red which is harmless. Possible body potassium loss if used for more than 10 consecutive days [301].

tcanta Dye Hedge Hedge WoodA green dye is obtained from the immature fruit[46, 57, 103, 115, 171]. Mixed with gum arabic and limewater, it makes a green pigment used in watercolour painting[238]. Yellow, orange and brownish dyes can also be obtained[100]. The colours are rich but fugitive[4]. A yellow dye is obtained from the bark[61, 100, 115]. It has been used to colour paper and maps[238]. Often grown as an informal hedge, it is also amenable to trimming[21,

186, 200]. Wood - hard, handsome with a marble-like grain. Used for small turnery[46, 61, 74].

dwatta Cathartic Depurative Diuretic Laxative PurgativeBoth the bark and the fruit of common buckthorn have been used for their purgative effect upon the body, however they can be rather violent in their action and so are rarely used in human medicines[244]. The berries, harvested when fully ripe, are cathartic, depurative, diuretic, laxative and violently purgative[1, 4, 9, 19, 46, 61, 218, 238]. About 8 - 15 of the mature fruits, chewed before breakfast, are a strong and effective laxative for adults, they should not be used by children[9]. An infusion of the not quite mature fruits is gentler in its action[9]. Use with caution, in large doses the fruit can cause vomiting and violent diarrhoea[9, 21]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve *Rhamnus cathartica* for constipation (see [302] for critics of commission E).

nrakta Europe, including Britain, from Scandinavia south and east to N. Africa and W. Asia. ksacta Fen peat, scrub, hedges, ash and oak woods, on calcareous often dry soils[17].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. Stored seed will require 1 - 2 months stratification at 5°C and should be sown as early in the year as possible in a cold frame[200]. Prick out the seedlings into individual pots when they are large enough to handle, and grow them on in the greenhouse or cold frame for their first winter. Plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame[113]. Cuttings of mature wood of the current year's growth, autumn in a frame. Layering in early spring[4].

nwatta Succeeds in any reasonably good soil[11]. Prefers a dry or moist calcareous soil[1, 4, 9] in sun or light dappled shade[200]. This species is hardy to at least -15°C[238]. Plants regenerate well after cutting or burning but young plants are rather prone to frost damage when grown in an exposed position[186]. Plants are resistant to cattle grazing but young plants can be damaged by rabbits[186]. Plants have a very shallow root system[186]. This species often bears the aecidiospore stage of 'crown rust' of oats so it should not be grown near cereals[1, 186]. The species in this genus are notably resistant to honey fungus[200]. A good bee plant[4, 108] and a main food plant for the brimstone butterfly[186]. Dioecious. Male and female plants must be grown if seed is required.

4.2.250 Rhamnus frangula

Alder Buckthorn

3 tlin 7 cyuc 0 kcak 3 tcan 3 dwat 5 m hkuc hmimhtut cyutli tucpja7n hwicli hrasljutnyik hpa7tli flat-prikilwis hpa7tmwatli xre7t hjonli

drutta Rhamnus frangula is a deciduous Shrub growing to 5 m (16ft) by 4 m (13ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from May to June, and the seeds ripen from September to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

pcista The plant is poisonous unless stored for 12 months before use[4, 19, 76]. This report is probably referring to the bark. Do not use in cases of intestinal obstruction, stenosis, atony, inflammatory colon disease, appendicitis, abdominal pain of unknown origin. Avoid long-term use. Two weeks recommended under medical supervision [301].

tcanta Charcoal Dye Hedge Hedge Nails WoodA yellow dye is obtained from the leaves and bark[4, 115]. It is much used in Russia and turns black when mixed with salts of iron[4]. A green dye is obtained from the unripe fruit[4, 115]. A blue or grey dye is obtained from the ripe berries[4, 115]. Plants can be grown as an informal (untrimmed) hedge, though they are also amenable to trimming[200]. The cultivar 'Tallhedge (syn 'Colummaris') is very suitable for this purpose[200]. The wood is used to make wooden nails, shoe lasts, veneer etc[46, 61]. It is the source of a high quality charcoal that is used by artists[4, 11, 13, 17, 100, 115, 182, 186].

drutta *Hypericum perforatum* is a PERENNIAL growing to 0.9 m (3ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from May to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Skin contact with the sap, or ingestion of the plant, can cause photosensitivity in some people[13, 76, 222]. Common side-effects are gastrointestinal disturbances, allergic reactions and fatigue. If used with drugs classed as serotonin reuptake inhibitors (fluoxetine:Prozac, paroxetine: Paxil) symptoms of serotonin syndrome may occur: mental confusion, hallucinations, agitation, headache, coma, shivering, sweating, fever, hypertension, tachycardia, nausea, diarrhoea, tremors. St John's wort can reduce the effectiveness of prescription medicine inc: contraceptive pill, antidepressants, immune suppressants, HIV medications, warfarin, digoxin [301].

kcakta Edible Parts: Edible Uses: TeaThe herb and the fruit are sometimes used as a tea substitute[7, 183]. The flowers can be used in making mead[183].

tcanta Dye TanninYellow, gold and brown dyes are obtained from the flowers and leaves[168]. A red is obtained from the flowers after acidification[141]. A red dye is obtained from the whole plant when infused in oil or alcohol[7, 61, 115]. A yellow is obtained when it is infused in water[7, 74, 115]. The plant is said to contain good quantities of tannin, though exact figures are not available[223].

dwatta Analgesic Antidepressant Antiseptic Antispasmodic Aromatic Astringent Chologogue Digestive Diuretic Expectorant Homeopathy Nerve Resolvent Sedative Stimulant Vermifuge VulnerarySt. John's wort has a long history of herbal use. It fell out of favour in the nineteenth century but recent research has brought it back to prominence as an extremely valuable remedy for nervous problems[254]. In clinical trials about 67% of patients with mild to moderate depression improved when taking this plant[254]. The flowers and leaves are analgesic, antiseptic, antispasmodic, aromatic, astringent, chologogue, digestive, diuretic, expectorant, nerve, resolvent, sedative, stimulant, vermifuge and vulnerary[4, 9, 13, 21, 165, 218, 222]. The herb is used in treating a wide range of disorders, including pulmonary complaints, bladder problems, diarrhoea and nervous depression[4]. It is also very effective in treating overnight incontinence of urine in children[4]. Externally, it is used in poultices to dispel herd tumours, caked breasts, bruising etc[4]. The flowering shoots are harvested in early summer and dried for later use[7]. Use the plant with caution and do not prescribe it for patients with chronic depression[238]. The plant was used to procure an abortion by some native North Americans, so it is best not used by pregnant women[257]. See also the notes above on toxicity[21, 222]. A tea or tincture of the fresh flowers is a popular treatment for external ulcers, burns, wounds (especially those with severed nerve tissue), sores, bruises, cramps etc[222, 238]. An infusion of the flowers in olive oil is applied externally to wounds, sores, ulcers, swellings, rheumatism etc[240]. It is also valued in the treatment of sunburn and as a cosmetic preparation to the skin[240]. The plant contains many biologically active compounds including rutin, pectin, choline, sitosterol, hypericin and pseudohypericin[222]. These last two compounds have been shown to have potent anti-retroviral activity without serious side effects and they are being researched in the treatment of AIDS[222, 238]. A homeopathic remedy is made from the fresh whole flowering plant[232]. It is used in the treatment of injuries, bites, stings etc and is said to be the first remedy to consider when nerve-rich areas such as the spine, eyes, fingers etc are injured[232].

nrakta Europe, including Britain, south and east to N. Africa, the Azores, Madeira and W. Asia. ksacta Open woods, hedgebanks and grassland, in dry sunny places, usually on calcareous soils[7, 17].

propta Seed - sow in a greenhouse as soon as it is ripe in the autumn or in the spring. It normally germinates in 1 - 3 months at 10°C. Prick out the seedlings into individual pots when they are large enough to handle and plant them out into their permanent positions in the summer. Division in spring or autumn[111, 238]. Very easy, larger clumps can

be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Easily grown in any reasonably good well-drained but moisture retentive soil[1]. Succeeds in dry soils[238]. Plants grow well in sun or semi-shade but they flower better when in a sunny position[200]. St. John's wort is often found as a weed in the garden[1]. It grows well in the summer meadow and is a useful plant for attracting insects[24]. The whole plant, especially when in bloom, gives off a most unpleasant smell when handled[245]. *Hypericum perforatum* is apparently an allotetraploid that would appear to have arisen from a cross between two diploid taxa, viz. *H. maculatum* subsp. *maculatum* (Europe to western Siberia) and *H. attenuatum* (western Siberia to China)[266]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [2-1].

4.2.171 Polypodium vulgare

Polypody, Adders Fern, Golden Maidenhair Fern, Wall Fern, Common Polypod Fern

3 tlin 6 cyuc 2 kcak 3 tcan 3 dwat 0.3 m hkuc pcimhmi cyutli kyuctup hwicli hyishrasljutnyikrip hpa7tli flatprikilwis hpa7tmwatli hjonli

drutta *Polypodium vulgare* is an evergreen Fern growing to 0.3 m (1ft) by 0.3 m (1ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in leaf all year. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers dry or moist soil.

pcista Although we have found no reports of toxicity for this species, a number of ferns contain carcinogens so some caution is advisable[200]. Many ferns also contain thiaminase, an enzyme that robs the body of its vitamin B complex. In small quantities this enzyme will do no harm to people eating an adequate diet that is rich in vitamin B, though large quantities can cause severe health problems. The enzyme is destroyed by heat or thorough drying, so cooking the plant will remove the thiaminase[172].

kcakta Edible Parts: RootEdible Uses: Root. Very sweet, it contains sugars, tannin and oils[13]. It is used as a liquorice adulterant[7]. The root has a unique, rather unpleasant odour and a sweet (cloying) flavour at first though it quickly becomes nauseating[222]. The root contains 15.5% saccharose and 4.2% glucose[218].

tcanta Insecticide PotashPlants can be grown as a ground cover in a shady position[188, 200]. They form a spreading carpet and are best spaced about 30cm apart each way[208]. The ash of burnt leaves is rich in carbonate of potash[4].

dwatta Alternative Anthelmintic Chologogue Demulcent Diuretic Expectorant Pectoral Purgative TonicPolypody stimulates bile secretion and is a gentle laxative. In European herbal medicine it is traditionally used as a treatment for hepatitis and jaundice and as a remedy for indigestion and loss of appetite[254]. It should not be used externally since it can cause skin rashes[254]. The root is alterative, anthelmintic, chologogue, demulcent, diuretic, expectorant, pectoral, purgative, tonic[4, 238, 240]. It can be used either fresh or dried and is best harvested in October or November, though it can be collected until February[4]. The leaves can also be used but are less active[4]. A tea made from the roots is used in the treatment of pleurisy, hives, sore throats and stomach aches and as a mild laxative for children[222]. It was also considered of value for lung ailments and liver diseases[222]. The poulticed root is applied to inflammations[222]. A tea or syrup of the whole plant is anthelmintic[222].

nrakta All of Europe, the Mediterranean, temperate Asia and eastern N. America. ksacta Rocks, walls and trees, as well as on the ground, in a variety of habitats[187] but especially in humid shady conditions[31].

propta Spores - best sown as soon as they are ripe, though they can also be sown in the spring. Sow them on the surface of a humus-rich sterilized soil. Keep the compost moist, preferably by putting a plastic bag over the pot. Pot on small clumps of plantlets as soon as they are large enough to handle and keep humid until they are well established. Do not plant outside until the ferns are at least 2 years old and then only in a very well sheltered position. Division. This is best done in the spring but it succeeds at most times of the year[1].

nwatta Landscape Uses:Border, Container, Erosion control, Foundation, Ground cover, Massing, Rock garden, Woodland garden. Easily grown in most light soils[187]. Prefers a soil of leaf mould and a cool but not too moist clay[1]. Prefers a cool damp shady position[1]. Thrives in dry shade[28, 188]. Established plants are drought tolerant[208]. They grow well on drystone walls[200]. Plants of ten grow as epiphytes[28, 31]. Members of this genus are rarely if ever troubled by browsing deer[233]. A rather variable plant, it is considered to be an aggregate species of several very similar species[187]. Only the roots should be planted, the rhizome being fixed to the surface of the soil[1, 187]. Special Features: Attractive foliage, Not North American native, There are no flowers or blooms. Polypodium virginianum (Polypodium vulgare subsp. virginianum (L.) Hultén is a synonym of Polypodium virginianum L.) commonly know as rock cap fern, or common polypody tolerates hardiness zones down to 3. It prefers acidic soil. It is a small evergreen species of fern native to the Eastern United States and Canada. It generally grows on rocks and occasionally on tree roots in nature. A small rhizomatous fern with narrow leaves 8–40 centimetres (3.1–15.7 in) long and 3–6 centimetres (1.2–2.4 in) wide. Polypodium virginianum typically grows on boulders, cliffs, and rocky slopes and does not need well-developed soil. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of “heat days” experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

4.2.172 Mentha x piperita citrata

Eau De Cologne Mint, Eau de Cologne Mint, Peppermint 3 tin 9 cyuc 2 kcaak 3 tcan 2 dwat 0.3 m hkuc hmimhtut cyutli tcup hwicli hrasjutnykfrp hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Mentha x piperita citrata is a PERENNIAL growing to 0.3 m (1ft) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pista Although no specific mention has been seen for this sub-species, it should be noted that, in large quantities, the closely allied *M. x piperita vulgaris* can cause abortions, especially when used in the form of the extracted essential oil, so it should not be used by pregnant women.

kcaakta Edible Parts: LeavesEdible Uses: Condiment TeaLeaves - raw or cooked. Used as a flavouring in salads or cooked foods[5]. A very pungent flavour, the leaves of the true eau-de-cologne mint are too aromatic for most tastes, though the cultivar 'Basil' has an excellent flavour and makes a very good substitute for basil in pesto[K]. A herb tea is made from the fresh or dried leaves[21, 183].

tcanta Essential Repellent StrewingLandscape Uses: Container, Ground cover, Woodland garden. An essential oil obtained from the whole plant is a source of lavender oil which is used in perfumery[46, 105, 238]. It is also used in oral hygiene preparations, toiletries etc[238]. Formerly used as a strewing herb[14], the plant repels insects, rats etc[14, 18, 20]. Rats and mice intensely dislike the smell of mint. The plant was therefore used in homes as a strewing herb and has also been spread in granaries to keep the rodents off the grain[244]. Dynamic accumulator.

dwatta Anodyne Antiseptic Antispasmodic Carminative Cholagogue Diaphoretic Refrigerant Stomachic Tonic VasodilatorEau de Cologne mint, like many other members of this genus, is often used as a domestic herbal remedy, being valued especially for its antiseptic properties and its beneficial effect on the digestion. Like other members of the genus, it is best not used by pregnant women because large doses can cause an abortion. The leaves and flowering plant are anodyne, antiseptic, antispasmodic, carminative, cholagogue, diaphoretic, refrigerant, stomachic, tonic, vasodilator[4, 9, 21, 165]. A tea made from the leaves has traditionally been used in the treatment of fevers, headaches, digestive disorders and various minor ailments[222]. The medicinal uses of this herb are more akin to lavender (*Lavandula* spp) than the mints. It is used to treat infertility, rapid heartbeat, nervous exhaustion etc[238]. The leaves are harvested as the plant comes into flower and can be dried for later use[238]. The essential oil in the leaves is antiseptic, though it is toxic in large doses[222].

nrakta Britain. ksacta A natural hybrid, *M. aquatica* x *M. spicata* found in moist soils on the sides of ditches, roadsides etc in S. England[5, 17].

propta Seed - sow spring in a cold frame. Germination is usually fairly quick. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. *Mentha* species are very prone to hybridisation and so the seed cannot be relied on to breed true. Even without hybridisation, seedlings will not be uniform and so the content of medicinal oils etc will vary. When growing plants with a particular aroma it is best to propagate them by division[K]. Division can be easily carried out at almost any time of the year, though it is probably best done in the spring or autumn to allow the plant to establish more quickly. Virtually any part of the root is capable of growing into a new plant. Larger divisions can be planted out direct into their permanent positions. However, for maximum increase it is possible to divide the roots up into sections no more than 3cm long and pot these up in light shade in a cold frame. They will quickly become established and can be planted out in the summer.

nwatta A very easily grown plant, it succeeds in most soils and situations so long as the soil is not too dry[1, 200]. Grows well in heavy clay soils. A sunny position is best for the production of essential oils, but the plant also succeeds in partial shade. Prefers a slightly acid soil[16]. Plants are very tolerant of neglect, succeeding in long grass[K]. Hybridizes freely with other members of this genus. Most mints have fairly aggressive spreading roots and, unless you have the space to let them roam, they need to be restrained by some means such as planting them in containers that are buried in the soil[K]. The flowers are very attractive to bees and butterflies[24]. A good companion for growing near cabbages and tomatoes, helping to keep them free of insect pests[14, 20]. The mint will need to be grown in containers to prevent it spreading too aggressively into the other plants. The whole plant has a strong minty aroma with a hint of ginger[245]. The plant produces a better quality essential oil if the plant is grown in dry ground[115]. Members of this genus are rarely if ever troubled by browsing deer[233]. Special Features:Attractive foliage, Edible, Fragrant foliage, Not North American native, Invasive, Naturalizing, Attracts butterflies, Suitable for cut flowers, Suitable for dried flowers. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [2-1].

likes wet soils[200]. Shade tolerant[200]. A very polymorphic species[58], it hybridizes freely with other members of this genus[50]. The young growth in spring is subject to damage by late frosts[1]. A colonizer of poor soils and cleared woodlands, it tolerates very poor soils[11]. Trees are notably susceptible to honey fungus[200].

4.2.246 Magnolia acuminata

Cucumber Tree, Cucumber Magnolia 3 tin 8 cyuc 0 kcaak 0 tcan 3 dwat 20 m hkuc hmimhtut cyutli tcup hwicli hrasjutnyk hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Magnolia acuminata is a deciduous Tree growing to 20 m (65ft) by 10 m (32ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from May to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Beetles. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. It can tolerate atmospheric pollution.

tcanta Rootstock WoodThe roots are very disease-resistant and are used as a rootstock for less vigorous species[226]. Wood - finely grained, soft, light, durable, not strong[4, 46, 61, 82, 171, 229, 235]. It weighs 29lb per cubic foot[235]. It takes a very good polish and is used for boxes, crates, flooring, cabinet making etc[4, 46, 61, 171, 229].

dwatta Antiperiodic Aromatic Diaphoretic Laxative Malaria Stimulant TonicA tea made from the bark is antiperiodic, aromatic, mildly diaphoretic, laxative, stimulant, tonic[4, 222]. It has historically been used as a substitute for quinine in the treatment of malaria[222]. An infusion has been used in the treatment of stomach ache and cramps[257]. The bark has been chewed by people trying to break the tobacco habit[222]. A hot infusion of the bark has been snuffed to treat sinus problems and has also been held in the mouth to treat toothaches[257]. The bark is harvested in the autumn and dried for later use[238]. It does not store well so stocks should be renewed annually[238]. A tea made from the fruit is a tonic, used in the treatment of general debility and was formerly esteemed in the treatment of stomach ailments[222].

nrakta Eastern N. America - New York to Georgia, west to Alabama and Ontario. ksacta Rich woods, especially in uplands[43]. Low mountain slopes and the rocky banks of streams[82].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed must be kept cold over the winter and should be sown in late winter in a cold frame[200]. The seed usually germinates in the spring but it can take 18 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for at least their first winter. They can be planted out into their permanent positions when they are more than 15cm tall, though should be well mulched and given some protection from winter cold for their first winter or two outdoors. Layering in early spring[200].

nwatta Landscape Uses:Border, Firewood, Pest tolerant, Aggressive surface roots possible, Specimen. Best grown in a warm position in a moderately rich free soil of an open texture[1]. Tolerates limey soils[200] so long as they are deep and rich in humus[188]. The branches are brittle and so a sheltered position is required[200]. Very tolerant of atmospheric pollution[200]. Plants are hardy to about -28°C[200]. A fairly fast-growing tree, it takes about 25 - 30 years before it first produces flowers and lives about 125 - 150 years in the wild[229]. The sub-species *M. acuminata cordata* begins flowering at an earlier age[245]. Good seed crops are produced about every 3 - 5 years[229]. The flowers have a delicate perfume[245]. The fleshy roots are easily damaged and any transplanting is best done during a spell of mild moist weather in late spring[182]. Special Features: North American native, Fragrant flowers, Attractive flowers or blooms.

4.2.247 Ostrya virginiana

Ironwood, Hophornbeam, Hop Hornbeam American, Hop Hornbeam Eastern

3 tin 9 cyuc 0 kcaak 0 tcan 1 dwat 15 m hkuc hmimhtut cyutli tcup hwicli hrasjutnyk hpa7tli flatprikliwis hpa7tmwatli hjonli

drutta *Ostrya virginiana* is a deciduous Tree growing to 15 m (49ft) by 12 m (39ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in September. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

tcanta WoodWood - close-grained, very hard, very strong, durable. It weighs 51lb per cubic foot. The wood is of a very high quality but the tree is not large enough to be used commercially. It is used locally for posts, mallets, tool handles and applications where resistance to wear is essential[11, 46, 61, 82, 103, 226, 227, 229]. A very good fuel, though it is almost impossible to split[226].

dwatta Antirheumatic Astringent Blood tonic Haemostatic PectoralThe bark is astringent, blood tonic and haemostatic[257]. A decoction of the bark is used to bathe sore muscles[257]. An infusion of the bark can be held in the mouth to relieve the pain of toothache[257]. An infusion of the heartwood has been used in the treatment of lung haemorrhages, coughs and colds, catarrh and kidney problems[257]. It is also used as a herbal steam bath in the treatment of rheumatism[257].

nrakta Eastern N. America - Nova Scotia to Manitoba, Nebraska, Florida and Texas. ksacta Rich moist woods[43, 227], it is also found on dry gravelly slopes and ridges, often in the shade of oaks and other large trees[82].

propta Seed - best sown as soon as it is ripe in a cold frame, it normally germinates in spring. The germination rate is variable but usually good[78]. 'Green' seed, harvested when the embryo has fully formed but before the outer coat has dried, sown immediately in a cold frame germinates very well. Stored seed requires stratification, 3 months warm then 5 months cold usually works well but germination can take 18 months[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the cold frame for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts.

nwatta Landscape Uses:Firewood, Pest tolerant, Specimen, Street tree, Woodland garden. An easily grown plant, succeeding in most soils[11].Thrives in any good loam, including chalk[200], it does not demand much light. Prefers a deep open loam. A rather slow-growing tree[227]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: North American native, Attractive flowers or blooms.

4.2.248 Cornus alternifolia

Green Osier, Alternatleaf dogwood, Alternate Leaf Dogwood, Golden Shadows Pagoda Dogwood, Green Osii 3 tin 8 cyuc 0 kcaak 0 tcan 2 dwat 6 m hkuc htut cyutli kyuctup hwicli hrasjutnykfrp hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Cornus alternifolia* is a deciduous Shrub growing to 6 m (19ft) by 6 m (19ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in June, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

tcanta Dye WoodA light to dark-brown dye is obtained from the roots with the addition of vinegar[226]. Wood - heavy, hard, close grained. It is too small to be of commercial value, but is used locally for turnery[82, 229].

dwatta Anthelmintic Antiaphionic Astringent Diaphoretic Febrifuge Ophthalmic Poultice Stimulant VDGreen osier was employed medicinally by a number of native North American Indian tribes who valued it particularly for its astringent bark which was used both internally and externally to treat diarrhoea, skin problems etc[257]. It is little used in modern herbalism. The dried bark is used as an astringent,

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

ksakta Edible Parts: Flowers LeavesEdible Uses: Flowers - raw[172]. Leaves - raw or cooked[172]. The leaves are rather hairy and are not so nice when eaten raw[172].

nrakta Western N. America - British Columbia to California. ksakta Open or lightly shaded places in plains and foothills, often with sagebrush or ponderosa pine, occasionally to 1500 metres[60].

propta Seed - best sown in a cold frame as soon as it is ripe[1, 200]. Seed stored seed as early in the year as possible. Protect from direct sunlight[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division, with care, in early spring or autumn[200].

nwatta Easily grown in an ordinary garden soil with some shade[1, 111].

4.2.243 Veronica spuria

bastard speedwell

3 tlin 7 cyuc 1 kcaak 0 tcan 0 dwat 0.5 m hkuc htut cyutli tcup hwicli hrasjltunyk hpa7tli flatprikliwis hpa7tmwatli fyfxre7t hjonli

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

ksakta Edible Parts: LeavesEdible Uses: Leaves and young shoots - raw or cooked. A famine food, they are only used when all else fails[179].

nrakta S.E. Europe to central Asia. A rare garden escape in Britain[17]. ksakta Mountain slopes and steppes around. 1100 metres in NW Xinjiang province, China[266].

propta Seed - sow autumn in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. If you have sufficient quantity the seed can be sown outdoors in situ in the autumn or the spring. Division in autumn or spring[200]. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring.

nwatta Easily grown in a moderately fertile moisture retentive well drained soil[200]. Prefers cool summers[200].

4.2.244 Maianthemum canadense

Canada Beadruby, Canada mayflower

3 tlin 7 cyuc 1 kcaak 2 tcan 1 dwat 0.1 m hkuc pcmhmmhtut cyutli tcup hwicli hrasjltunyk hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Maianthemum canadense is a PERENNIAL growing to 0.1 m (0ft 4in) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

pcista There is a warning that the fruit should only be used with caution, but no more details are given[105].

ksakta Edible Parts: Fruit Leaves Root ShootsEdible Uses: Fruit[105, 161, 257]. We have no more details except a warning that the fruit should be used with caution. The fruit is about 6mm in diameter[200].

tcanta Plants can be used as ground cover in shady positions[187, 197], doing well in a wild or woodland garden[200].

dwatta Expectorant KidneyA tea made from the plant has been used in the treatment of headaches and as a kidney tonic for pregnant women[222, 257]. It is also used as a gargle for sore throats and as an expectorant[222, 257].

nrakta Eastern N. America - Labrador to Georgia, west to Tennessee and Iowa. ksakta Woods and recent clearings, often to the sub-alpine zone[43], in humus-rich slightly acid soils[200].

propta Seed - best sown quite thinly it as soon as it is ripe in a cold frame, it should germinate in the spring. Stored seed should be sown in late winter in a cold frame, it might take 18 months to germinate. Allow the seedlings to grow on in the pot for their first year, giving liquid feeds as necessary to ensure that they do not go hungry. Divide the plants into individual pots once they have died down in late summer. Grow them on in pots for another year or more until large enough to plant out[K]. Division as new growth commences in the spring. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Requires a cool shady moist but not wet position[1, 187]. Plants tolerate warm summers only if the soil remains moist[200]. A mat forming plant, it can be invasive in good conditions[200]. The flowers are sweetly scented[245]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

4.2.245 Betula ermanii

Gold Birch

3 tlin 7 cyuc 0 kcaak 3 tcan 1 dwat 25 m hkuc hmimhtut cyutli tcup hwicli hyishrasjltunykfrip hpa7tli flatprikliwis hpa7tmwatli hjonli

drutta Betula ermanii is a deciduous Tree growing to 25 m (82ft) by 5 m (16ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower in April, and the seeds ripen in September. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

tcanta PioneerThe tree colonizes poor soils and cleared woodlands in the wild[11]. This makes it suitable for use as a pioneer species for re-establishing woodlands. It is a quite short-lived species, but grows fairly quickly and creates suitable conditions for more permanent trees to become established. Because its seedlings do not grow well in shady conditions, the birch is eventually out-competed by the other woodland trees.

dwatta Antiseborrheic VulneryVulnerary. The bark is used to bandage wounds[61].

nrakta N.E. Asia - China, Japan. ksakta Mountains all over Japan[58].

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

nwatta Succeeds in a well-drained loamy soil in a sheltered position[11, 200]. Grows well in heavy clay soils. Dis-

4.2.173 Equisetum arvense

Field Horsetail

3 tlin 11 cyuc 2 kcaak 4 tcan 3 dwat 0.6 m hkuc hmimhtut cyutli kyuctup hwicli hyishrasjltunyk hpa7tli flatprikliwis hpa7tmwatli hjonli

drutta Equisetum arvense is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 3. The seeds ripen in April. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Large quantities of the plant can be toxic. This is because it contains the enzyme thiaminase[172], a substance that can rob the body of the vitamin B complex[65]. In small quantities this enzyme will do no harm to people eating an adequate diet that is rich in vitamin B, though large quantities can cause severe health problems. The enzyme is destroyed by heat or thorough drying, so cooking the plant will remove the thiaminase[172]. The plant also contains equisetinic acid - see the notes on medicinal uses for more information[213]. Avoid in patients with oedema due to heart failure or impaired kidney function [301].

ksakta Edible Parts: Root StemEdible Uses: Strobil (the fertile shoots in spring) - cooked and used as an asparagus substitute[7, 46, 61, 94]. They should be used when young[116] but even so it is probably best to change the water, perhaps 3 - 4 times[85, 102]. One report says that they can be eaten raw[172], they are peeled and the shoot tip is discarded[213]. It is said to be a very tedious operation and they should not be eaten raw in any quantity, see the notes above on toxicity[K]. Some native tribes liked to eat the young vegetative shoots, picked before they had branched out, and would often collect them in great quantity then hold a feast to eat them[257]. The leaf sheaths were peeled off and the stems eaten raw - they were said to be 'nothing but juice'[257]. Roots - raw[61]. The tuberous growths on the rhizomes are used in the spring[172]. The black nodules attached to the roots are edible[257]. It takes considerable effort to collect these nodules so it is normally only done in times of desperation. However, native peoples would sometimes raid the underground caches of roots collected by lemmings and other rodents in order to obtain these nodules[257]. A further report says that the peeled stems, base of the plant, root and tubers were eaten raw by the N. American Indians, the report went on to say that this may be inadvisable[85].

tcanta Dye Fungicide Liquid feed Musical Paper Polish Sandpaper ScourerThe stems contain 10% silica and are used for scouring metal[4, 7, 20, 94, 102] and as a fine sandpaper[7, 54, 99, 257]. They can also be used as a polish for brass, hardwood etc[94]. The infused stem is an effective fungicide against mildew, mint rust and blackspot on roses[14, 18, 20, 54]. It also makes a good liquid feed[54]. A light pink dye is obtained from the stem[99, 257]. It is yellow-gray according to another report[102]. The plant has been used for making whistles[257].

dwatta Anodyne Antirheumatic Antiseptic Astringent Cardiac Carminative Diaphoretic Diuretic Eczema Galactogogue Haemostatic Homeopathy Nerve TB Urinary VulneraryHorsetails have an unusual chemistry compared to most other plants[238]. They are rich in silica, contain several alkaloids (including nicotine) and various minerals[238]. Horsetail is very astringent and makes an excellent clotting agent, staunching wounds, stopping nosebleeds and reducing the coughing up of blood[254]. It helps speed the repair of damaged connective tissue, improving its strength and elasticity[254]. The plant is anodyne, antihemorrhagic, antiseptic, astringent, carminative, diaphoretic, diuretic, galactogogue, haemostatic and vulnerary[4, 7, 9, 20, 21, 46, 61, 165, 172, 218, 240]. The green infertile stems are used, they are most active when fresh but can also be harvested in late summer and dried for later use[4, 9]. Sometimes the ashes of the plant are used[4]. The plant is a useful diuretic when taken internally and is used in the treatment of kidney and bladder problems, cystitis, urethritis, prostate disease and internal bleeding, proving especially useful when there is bleeding in the urinary tract[4, 238, 254]. A decoction applied externally will stop the bleeding of wounds and promote healing[4]. It is especially effective on nose bleeds[7]. A decoction of the herb added to a bath benefits

slow-healing sprains and fractures, as well as certain irritable skin conditions such as eczema[254]. The plant contains equisetinic acid, which is thought to be identical to acetic acid. This substance is a potent heart and nerve sedative that is a dangerous poison when taken in high doses[213]. This plant contains irritant substances and should only be used for short periods of time[238]. It is also best only used under the supervision of a qualified practitioner. A homeopathic remedy is made from the fresh plant[7]. It is used in the treatment of cystitis and other complaints of the urinary system[7]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Equisetum arvense for urinary tract infections, kidney and bladder stones, wounds and burns (see [302] for critics of commission E).

nrakta Arctic and temperate regions of Europe, including Britain, N. America and Asia. ksakta Open fields, arable land, waste places, hedgerows and roadsides[9], usually on moist soils[4].

propta Spores - best collected as soon as they are ripe in the spring and surface-sown immediately on a sterile compost. Keep moist and pot up as soon as the plants are large enough to handle. Very difficult[200]. Division. The plants usually spread very freely when well sited and should not really need any assistance.

nwatta Prefers poor dusty ground[53, 54]. This rather contradicts another report which says that the presence of this plant indicates underground water[4]. Prefers a moist but well-drained fertile soil with a pH between 6.5 and 7.5[200, 238]. A very cold-hardy species tolerating temperatures down to about -30°C[200]. Plants have a deep and penetrating root system and can be invasive. If grown in the garden they are best kept in bounds by planting them in a large container which can be sunk into the ground[200]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fleshy. Thick or swollen - fibrous or tap root [2-1].

4.2.174 Ajuga reptans

Bugle, Common Bugleweed, Bugleweed, Carpet Bugleweed, Carpet Bugle

3 tlin 10 cyuc 2 kcaak 2 tcan 3 dwat 0.3 m hkuc pcmhmmhtut cyutli hpatkyuctuphja7n hwicli hrasjltunyk hpa7tli flatprikliwis hpa7tmwatli fyfxre7t hjonli

drutta Ajuga reptans is an evergreen Perennial growing to 0.3 m (1ft) by 0.6 m (2ft in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf all year, in flower from May to July, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry moist or wet soil and can tolerate drought.

ksakta Edible Parts: LeavesEdible Uses: Young shoots - raw[7].

tcanta A good ground-cover for a position in semi-shade[200], forming a carpet and rooting as it spreads[208]. Fairly fast growing but it does not always smother out weeds and can become bare at the centre if not growing in good conditions[197]. Perennial groundcover for zone 2 firebreaks. The US government has created a system of firebreaks for areas prone to wildfires, these are separated into concentric zones surrounding buildings. Zone 2 is the second away from the house. These low-level groundcovers provide little fuel.

dwatta Aromatic Astringent Bitter HomeopathyBugle has a long history of use as a wound herb and, although little used today, it is still considered very useful in arresting haemorrhages and is also used in the treatment of coughs and spitting of blood in incipient consumption[4, 254, 268]. The plant contains digitalis-like substances (these are commonly found in Digitalis species and are used in treating heart complaints) and is thought to possess heart tonic properties[268]. It has also been considered good for the treatment of excessive alcohol intake[4]. The whole plant is aro-

matic, astringent and bitter[4, 7, 9]. The plant is usually applied externally[7]. It is harvested as it comes into flower in late spring and dried for later use[4, 7]. It is also commonly used fresh in ointments and medicated oils[238]. A homeopathic remedy is made from the whole plant. It is widely used in various preparations against throat irritations and especially in the treatment of mouth ulcers[7].

nrakta Most of Europe, including Britain, to S.W. Asia and N. Africa. ksacta Damp grassy fields and damp woods[7, 13, 17].

propta Seed - sow spring or autumn in a cold frame. The seed usually germinates in 3 - 4 weeks at 10°C[133], though it can be erratic[238]. Prick out the seedlings when they are large enough to handle and plant them out in the summer[K]. Division of runners at almost any time of year. Very easy, the divisions can be planted straight out into their permanent positions if required.

nwatta Landscape Uses:Border, Container, Erosion control, Ground cover, Massing, Rock garden, Specimen, Woodland garden. Prefers a humus-rich, moisture retentive soil and partial shade[28, 31, 200]. Does well in marshy soil and in the spring meadow[24]. Grows well in dry shade[187, 190] and is fairly drought tolerant once established, though it shows distress in severe drought[190]. Plants do not always ripen their seeds in Britain, they spread freely by runners, however, and soon form an extensive patch in suitable conditions[4]. A number of forms have been selected for their ornamental value, several of them are variegated and these are used especially as ground cover plants for dry shade[187]. A purple-leaved form, 'Atropurpurea' does well in full sun so long as the soil is not dry[208]. A good bee and butterfly plant[24]. Special Features:Attractive foliage, Not North American native, Naturalizing. Heat Zone: 9-1.

4.2.175 Glechoma hederacea

Ground Ivy, Field Balm, Gill Over The Ground, Runaway Robin

3 tin 10 cyuc 2 kcaak 3 tcan 3 dwat 0.2 m hkuc hmimhtut cyutli tcup hwicli jlutnykfrkip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Glechoma hederacea is an evergreen Perennial growing to 0.2 m (0ft 8in) by 1 m (3ft 3in) at a fast rate. It is not frost tender. It is in leaf all year, in flower from March to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista A report in the medicinal uses says the plant should be used with caution, no reason is given. Another report says that the plant might be toxic to horses[222]. Avoid if pregnant as abortifacient. Contraindicated in epilepsy. Avoid if kidney disease [301].

kcakta Edible Parts: LeavesEdible Uses: Condiment TeaYoung leaves - raw or cooked[9]. The leaves have a bitter flavour[5], they can be mixed into salads to add a slight aromatic tang[7]. They can also be cooked like spinach, added to soups etc or used as a flavouring[2, 183]. Available very early in the year. A herb tea is made from the fresh or dried leaves[2, 177, 183]. It is often used mixed with verbena leaves[7]. The herb has been added to beer in much the same way as hops in order to clear it and also to improve its flavour and keeping qualities[4, 183]. This species was the most common flavouring in beer prior to the use of hops from the 16th century onwards[238].

tcanta MiscellanyA good ground cover plant for shady places. It is rather vigorous though and can swamp smaller plants[197].

dwatta Anodyne Antidiarrhoeal Antiphlogistic Antirheumatic Appetizer Astringent Digestive Diuretic Febrifuge Miscellany Pectoral Stimulant Tonic Vermifuge-Ground ivy is a safe and effective herb that is used to treat many problems involving the mucous membranes of the ear, nose, throat and digestive system[254]. A well-tolerated treatment it can be given to children to clear lingering catarrh and to treat chronic conditions such as glue ear and sinusitis[254]. Throat and chest problems, especially those due to excess catarrh, also benefit from this remedy[254].

The leaves and flowering stems are anodyne, antiphlogistic, appetizer, astringent, digestive, diuretic, febrifuge, pectoral, gently stimulant, tonic and vermifuge[4, 9, 21, 100, 147, 165, 178]. They are best harvested in May whilst still fresh[4], and are dried for later use[238]. The leaves are used in the treatment of hypersensitivity in children and are useful in the treatment of kidney diseases and indigestion[4, 9, 21, 100, 147, 165, 178]. Applied externally, the expressed juice speeds the healing of bruises and black eyes[4]. Use with caution[21].

nrakta Most of Europe, including Britain, northern and western Asia to Japan. ksacta Damp waste ground, hedgerows and woodland margins[7].

propta Seed - we have no information for this species but suggest sowing the seed in situ as soon as it is ripe, or in the spring. Division in spring or autumn[188]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Landscape Uses:Container, Ground cover. Prefers a heavy soil and dappled shade[17, 31]. Prefers a moist well-drained soil, succeeding in sun or shade[188]. A very invasive plant, spreading freely at the roots[1, 31, 238]. A good bee plant[108]. Special Features:Attractive foliage, Fragrant foliage, Not North American native, Naturalizing, Attractive flowers or blooms. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [2-1].

4.2.176 Prunella vulgaris

Self-Heal, Common selfheal, Aleutian selfheal, Lance selfheal 3 tin 7 cyuc 2 kcaak 0 tcan 3 dwat 0.2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Prunella vulgaris is a PERENNIAL growing to 0.2 m (0ft 8in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from July to September, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: DrinkLeaves - raw or cooked[9]. They can be used in salads, soups, stews etc[183]. Somewhat bitter due to the presence of tannin in the leaves, though this can be removed by washing the leaves[177]. A cold water infusion of the freshly chopped or dried and powdered leaves is used as a refreshing beverage[161, 183]. Very tasty[168].

tcanta DyeAn olive-green dye is obtained from the flowers and stems[168]. The plant is a good ground-cover in sunny positions or light shade[200].

dwatta Alterative Antibacterial Antibiotic Antidiarrhoeal Antipyretic Antiseptic Antispasmodic Astringent Carminative Diuretic Febrifuge Hypotensive Stomachic Styptic Tonic Vermifuge VulnerarySelf heal has a long history of folk use, especially in the treatment of wounds, ulcers, sores etc[7]. It was also taken internally as a tea in the treatment of fevers, diarrhoea, sore mouth, internal bleeding etc[4, 222]. In Korea it is used to treat oedema, nephritis, scrofula and goitre[279]. The whole plant is alterative, antibacterial, antipyretic, antiseptic, antispasmodic, astringent, carminative, diuretic, febrifuge, hypotensive, stomachic, styptic, tonic, vermifuge and vulnerary[4, 9, 13, 21, 176, 218]. It has an antibacterial action, inhibiting the growth of Pseudomonas, Bacillus typhi, E. coli, Mycobacterium tuberculosis etc[176]. It can be used fresh or dried, for drying it is best harvested in mid-summer[4]. The plant is experimentally antibiotic and hypotensive[218, 222].

nrakta Europe, including Britain, from Norway south and east to N. Africa and temperate Asia. ksacta Waste ground, grassland, woodland edges etc, usually on basic and neutral soils[9, 17].

4.2.239 Artemisia scoparia

Redstem wormwood

3 tin 7 cyuc 1 kcaak 0 tcan 2 dwat 0.6 m hkuc htut cyutli hgatkuyctup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Artemisia scoparia is a BIENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 3. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista Although no reports of toxicity have been seen for this species, skin contact with some members of this genus can cause dermatitis or other allergic reactions in some people[222].

kcakta Edible Parts: LeavesEdible Uses: Young leaves - cooked[177].

tcanta EssentialThe seed and flowering stems contain 0.75% essential oil[240].

dwatta Antibacterial Anticholesterolemic Antipyretic Antiseptic Chologogue Diuretic VasodilatorThe plant is anticholesterolemic, antipyretic, antiseptic, chologogue, diuretic and vasodilator[176]. It has an antibacterial action, inhibiting the growth of Staphylococcus aureus, streptococci, Bacillus dysenteriae, B. typhi, B. subtilis, Pneumococci, C. diphtheriae, mycobacterium etc[176]. It is used in the treatment of jaundice, hepatitis and inflammation of the gall bladder[176]. The plant is also used in a mixture with other herbs as a chologogue[218].

nrakta C. Europe to W. Asia. ksacta Waste ground in C. Japan[58].

propta Seed - sow late spring in a cold frame. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer.

nwatta Easily grown in a well-drained circumneutral or slightly alkaline loamy soil, preferring a warm sunny dry position. Established plants are drought tolerant[200]. Plants are longer lived, more hardy and more aromatic when they are grown in a poor dry soil[245]. Members of this genus are rarely if ever troubled by browsing deer[233].

4.2.240 Athyrium niponicum

Painted Fern, Japanese Silver Painted Fern

3 tin 8 cyuc 1 kcaak 0 tcan 0 dwat 0.3 m hkuc pimhmim cyutli tcuphja7n hwicli hrasjlutnyikfrkip hpa7tli frusflatprikliwis hpa7tmwatli hjonli

drutta Athyrium niponicum is a FERN growing to 0.3 m (1ft) by 0.3 m (1ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist or wet soil.

pcista Although we have found no reports of toxicity for this species, a number of ferns contain carcinogens so some caution is advisable[200]. Many ferns also contain thiaminase, an enzyme that robs the body of its vitamin B complex. In small quantities this enzyme will do no harm to people eating an adequate diet that is rich in vitamin B, though large quantities can cause severe health problems. The enzyme is destroyed by heat or thorough drying, so cooking the plant will remove the thiaminase[172].

kcakta Edible Parts: LeavesEdible Uses: Very young fronds (croziers) - boiled[177]. Some caution is advised. See the notes above on toxicity.

nrakta E. Asia - China, Japan, Korea. ksacta Shaded places in lowland all over Japan[58].

propta Spores - surface sow in a pot of sterile compost in a shady part of the greenhouse and keep moist, this is most easily done by putting the pot in a plastic bag. Pot up small clumps of the plants when they are large enough to handle and keep them moist until they are established. Plant out in late spring of the following year. Division in spring as plants come into growth. Larger divisions can be planted straight into their permanent positions whilst smaller clumps are best

potted up and kept in a cold frame until they are growing away well.

nwatta Landscape Uses:Alpine garden, Border, Container, Massing, Rock garden, Woodland garden. An easily grown plant, it is calcifuge and prefers an acid soil with a pH from 4.5 to 6.5, but it tolerates alkaline soils if plenty of leaf mould is added[200]. Grows well in heavy clay soils. Prefers a moist sheltered site with moderately high atmospheric humidity[200]. Succeeds in a semi-shaded bog-garden or in damp woodland, also in garden borders in full or part shade[200]. Members of this genus are rarely if ever troubled by browsing deer[233]. Special Features: Attractive foliage.

4.2.241 Ranunculus repens

Creeping Buttercup, Prairie Double-flowered Buttercup, Water Buttercup, Creeping Buttercup 3 tin 8 cyuc 1 kcaak 0 tcan 1 dwat 0.3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrkip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Ranunculus repens is a PERENNIAL growing to 0.3 m (1ft) by 1 m (3ft 3in) at a fast rate. It is not frost tender. It is in flower from May to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All parts of the plant are poisonous[19], the toxins being destroyed by heat or by drying[65]. The plant also has a strongly acrid juice that can cause blistering to the skin[65, 183].

kcakta Edible Parts: Leaves RootEdible Uses: Leaves - cooked and used as a pot-herb[2, 105]. A famine food, used when all else fails, and I would rather give it a miss even then[K]! See the notes above on toxicity. Root - must be dried beforehand and thoroughly cooked[118]. Personally, I would rather give this one a miss[K], see the notes above on toxicity.

dwatta Analgesic RubefacientThe entire plant is analgesic and rubefacient[257]. A poultice of the chewed leaves has been used in the treatment of sores, muscular aches and rheumatic pains[257]. Some caution is advised in the use of this plant, see the notes above on toxicity.

nrakta Europe, including Britain, from Norway south and east to Spain, through Asia to China and Japan. ksacta Wet meadows, pastures, woods, dune slacks etc[19]. A common and rampant weed, avoiding acid soils[19].

propta Seed - sow spring in a cold frame. A very common weed, it doesn't really need any help from us. Division in spring. Very easy, though probably totally unnecessary, larger divisions can be planted out direct into their permanent positions.

nwatta Landscape Uses:Ground cover, Woodland garden. Prefers a moist loamy soil on the heavy side. A rampantly spreading weed of grassland, few gardeners would want to introduce it to their land[K]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54]. Special Features:Attractive foliage, North American native, Invasive, Naturalizing, Wetlands plant, Extended bloom season in Zones 9A and above. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is suckering with new plants from runners away from the plant [2-1].

4.2.242 Mertensia longiflora

Small bluebells

3 tin 7 cyuc 1 kcaak 0 tcan 0 dwat 0.4 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Mertensia longiflora is a PERENNIAL growing to 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 3. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and

female organs) and is pollinated by Insects. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: TeaThe leaves are a tea substitute[177, 183].

dwatta Blood purifier Skin VulneraryThe herb is a blood purifier and vulnerary[4]. It is applied externally to skin diseases and is said to be an efficacious treatment for the itch[4]. Internally, an infusion of the leaves once had a good reputation in the treatment of coughs, asthma, catarrh etc[4].

nrakta Europe, including Britain, from Scandinavia south and east to Spain, north and western Asia. ksacta A common plant of grassland, woods, hedges etc[1, 13, 17].

propta Seed - sow autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. If you have sufficient quantity, the seed can be sown in situ in the autumn or the spring. Division in autumn or spring. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring.

nwatta Easily grown in a moderately fertile moisture retentive well drained soil[200]. Prefers cool summers[200]. A good bee plant[24]. A common garden weed, it grows well in a lawn[200] and can be grown in the spring meadow[24]. It is also a good plant for the flower border[1].

4.2.236 *Muscari botryoides*

Italian Grape Hyacinth, Common grape hyacinth, White Grape Hyacinth

3 tlin 8 cyuc 1 kcak 2 tcan 0 dwat 0.3 m hkuc hmimhtut cyutli kyuctup hwicli hrasljutnyik hpa7tli flat-priklwis hpa7tmwatli fyifxre7t hjonli

drutta *Muscari botryoides* is a BULB growing to 0.3 m (1ft) by 0.1 m (0ft 4in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: FlowersEdible Uses: The flowers and flower buds can be pickled in vinegar[183].

tcanta Landscape Uses: Border, Container, Massing, Rock garden, Specimen, forest garden.

nrakta C. and S.E. Europe. ksacta Meadows, thickets and roadsides in Eastern N. America, where it is a garden escape[235].

propta Seed - best sown as soon as ripe in a greenhouse[200]. The seed can also be sown in early spring in a greenhouse. A good proportion of the seed usually germinates within 2 - 3 months. Sow the seed thinly so that the seedlings can be left undisturbed in the pot for their first year of growth. Give them an occasional liquid feed in the growing season to ensure they do not become nutrient deficient. When the plants become dormant in late summer, pot up the small bulbs placing 2 - 3 bulbs in each pot. Grow them on for another one or two years in the greenhouse before planting them out when they are dormant in late summer. Division of offsets in July/August after the leaves die down[1]. It can be done every other year if a quick increase is required[1]. Larger bulbs can be replanted direct into their permanent positions, but it is best to pot up the smaller bulbs and grow them on in a cold frame for a year before planting them out when they are dormant in late summer.

nwatta A very easily grown plant[200], it prefers a rich open well-drained soil[1] but succeeds in any soil and situation[1, 42, 90]. The dormant bulbs are very hardy and will withstand soil temperatures down to at least -10°C[214]. Does very well in short grass[1], increasing freely and it can become invasive[200]. There are some named forms, selected for their ornamental value[200]. The flowers have a

scent that resembles the honey-musk scent of buddleia[245]. Special Features:Attractive foliage, Naturalizing, Fragrant flowers.

4.2.237 *Bromus thominii*

Soft Brome

3 tlin 7 cyuc 1 kcak 0 tcan 0 dwat 0.8 m hkuc hmimhtut cyutli kyuctup hwicli hrasljutnyik hpa7tli flat-priklwis hpa7tmwatli fyifxre7t hjonli

drutta *Bromus thominii* is a BIENNIAL growing to 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from May to July, and the seeds ripen from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind, Cleistogomy (self-pollinating without flowers ever opening). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Seed - cooked[257]. The seed can be dried, ground into a powder then mixed with water and eaten as a gruel[257]. The seed is small and fiddly to utilize[K].

nrakta W. Europe, from Britain and France to Scandinavia. ksacta Meadows, waste places, and on dunes, shingle banks and cliffs, mainly in southern Britain[17].

propta Seed - sow spring or autumn in situ and only just cover. Germination should take place within 2 weeks. If seed is in short supply it can be surface sown in a cold frame in early spring. When large enough to handle, prick out the seedlings into individual pots and plant them out in early summer. Division in spring. Large clumps can be planted out direct into their permanent positions whilst it is best to pot up smaller clumps and grow them on in a cold frame until they are ready to be planted out.

nwatta Succeeds in a sunny position in most well-drained soils[138, 200]. The plant produces open, wind-pollinated flowers and also cleistogamous flowers - these do not open and are self-fertilized[17]. The report regarding edibility in [257] refers to *B. hordaceus* L. [17] gives this species as a synonym for *B. thomasi*, but only the section *Holmberg*.

4.2.238 *Geranium erianthum*

Wooly Geranium

3 tlin 7 cyuc 1 kcak 0 tcan 1 dwat 0.3 m hkuc hmimhtut cyutli kcup hwicli hrasljutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta *Geranium erianthum* is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from June to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers LeavesEdible Uses: Leaves - raw or cooked. Not choice[172]. Flowers - raw[172].

dwatta Astringent Salve StypticThe whole plant, but especially the roots, is astringent, salve and styptic. It can be used as a gargle for sore throats[172].

nrakta North-western N. America to E. Asia. ksacta Sub-alpine meadows and scrub, also on grassy slopes near the sea[187]. Woods and meadows from low elevations to fairly high elevations in the mountains[204].

propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Succeeds in any moderately fertile retentive soil in a sunny position[200]. Tolerates a range of soil types[200]. Plants are hardy to about -20°C[187]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233].

propta Seed - sow in mid spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. If you have sufficient seed then it can be sown outdoors in situ in mid to late spring. Division in spring or autumn. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Thrives in any damp soil[1], in full sun or in light shade[238]. Plants are apt to become troublesome weeds in turf that is at all damp[1]. Self heal is a good plant for growing in the spring meadow[24].

4.2.177 *Sedum ternatum*

Woodland stonecrop or Wild stonecrop

3 tlin 9 cyuc 2 kcak 2 tcan 0 dwat 0.2 m hkuc pcmhmimhtut cyutli hgatkyuctup hwicli hrasljutnyik hpa7tli prikwiisslip hpa7tmwatli hjonli

drutta *Sedum ternatum* is an evergreen Perennial growing to 0.2 m (0ft 6in) by 0.3 m (1ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. The flowers are pollinated by Bees, Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

kcakta Leaves. Succulent young leaves [1-2].

tcanta Ground cover including semi-shade. A good rock gardens plant. Invertebrates shelter: beneficial for insects and other arthropods. Nectary: provides nectar or pollen for beneficial insects [1-2]. The flower nectar and pollen of stonecrops (*Sedum* spp.) attract various kinds of bees, including *Andrena forbesii* (Krombein et al., 1979). Less often, wasps and flies visit flowers of these plants. Insects that feed on the foliage of Wild Stonecrop (*Sedum ternatum*) include the *Sedum* Aphid (*Aphis sedi*) and the aphid *Aphis acrita*. The Eastern Chipmunk eats the roots of this plant (Wrazen and Svendsen, 1978).

nrakta Native to the eastern United States from Maine to Georgia and west from Michigan to Iowa and Arkansas. ksacta Wooded ravines, partially shaded banks along rivers and streams, lightly shaded cliffs, and rocky wooded slopes. Found on slopes where there is little ground vegetation normally in or near woodlands.

propta Division, Cuttings. Easy - divide or cut stems and lay on potting soil or place shallowly into the potting soil.

nwatta The preference is partial sun to light shade, moist to dry-mesic conditions, and a loamy or rocky soil. Tolerates part shade and moist soils better than most other sedums. Bloom Time: April to May. Bloom Description: White. Flower: Showy. Attracts: Bees, Butterflies. Tolerates rabbit, deer, drought, air pollution.For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. Evergreen. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2].

4.2.178 *Lamium galeobdolon*

Yellow Archangel

3 tlin 9 cyuc 2 kcak 3 tcan 1 dwat 0.3 m hkuc pcmhmimhtut cyutli hgattcup hwicli hrasljutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta *Lamium galeobdolon* is a PERENNIAL growing to 0.3 m (1ft) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought.

kcakta Edible Parts: Flowers LeavesEdible Uses: Young leaves and shoots - cooked[183]. Young flowering tips - cooked.

tcanta A good ground cover plant, spreading rapidly by means of its rooting stems and succeeding even in dense shade. It is very vigorous, however, and can smother small plants[31, 197, 200]. It does very well in woodlands[K].

dwatta Antispasmodic Astringent Diuretic Expectorant Styptic VasoconstrictorThe herb is antispasmodic, astringent, diuretic, expectorant, styptic and vasoconstrictor[4].

nrakta Europe, including Britain, from Sweden south and east to Spain and Iran. ksacta Woods and shady hedgerows[5, 31], usually on heavier soils. Sometimes becoming locally dominant, especially after coppicing[17].

propta Seed - usually self sows freely and should not require human intervention. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. The seed can also be sown in situ as soon as it is ripe. Division in spring. Succeeds at almost any time in the growing season. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Landscape Uses:Ground cover, Massing, Woodland garden. A very easily grown plant, it tolerates most soils and conditions[200]. It grows well in heavy clay soils[17], though it prefers a light calcareous soil[1]. Dislikes dry soils[31]. This species succeeds even in dense shade, growing well under trees[31, 200]. Once established, it can also succeed in drought conditions under the shade of trees, providing there is plenty of humus in the soil[190]. There are at least four sub-species. *L. galeobdolon montanum* is the form generally found wild in Britain and it is a triploid. *L. galeobdolon luteum* and *L. galeobdolon flavidum* are both diploids[187]. *L. galeobdolon argentatum* is the more rampant form, its clone 'Variegatum' is a commonly used ground cover plant for shady places[187]. Plants seem to be immune to the predations of rabbits[233]. A very invasive plant, sending out long prostrate shoots that root at intervals along the stems[31, 200]. Special Features: Attractive foliage, Naturalizing. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [2-1].

4.2.179 *Populus nigra*

Black Poplar, Lombardy poplar

3 tlin 9 cyuc 1 kcak 4 tcan 3 dwat 30 m hkuc htat cyutli kcup hwicli hrasljutnyikfrip hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta *Populus nigra* is a deciduous Tree growing to 30 m (98ft) by 20 m (65ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 2. It is in flower in April, and the seeds ripen in June. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Wind. The plant is not self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

kcakta Edible Parts: Inner barkEdible Uses: Inner bark - dried, ground then added to flour and used for making bread etc[2]. A famine food, used when all else fails[177].

tcanta Cork Fodder Rooting hormone Shelterbelt WoodAn extract of the shoots can be used as a rooting hormone for all types of cuttings. It is extracted by soaking the chopped up shoots in cold water for a day[172]. A fast growing tree, it is often used to provide a quick screen or wind-break[200]. The cultivar 'Italica' is commonly used for this purpose though it is not a very suitable choice because it has fragile branches and is prone to basal rot which can cause sudden collapse[200]. The cultivar 'Plantierensis' is much more suitable[200]. A resin obtained from the buds is made

into a salve and used in home remedies[46]. The bark is used as a cork substitute for floats etc[115]. Wood - very soft, very light, rather woolly in texture, without smell or taste, of low flammability, not durable, easy to work, very resistant to abrasion. Used for lower quality purposes[11, 46, 61, 115, 227].

dwatta Alternative Anodyne Antiinflammatory Astringent Diaphoretic Diuretic Expectorant Febrifuge Salve Stimulant Tonic Urinary VulneraryThe leaf buds are covered with a resinous sap that has a strong turpentine odour and a bitter taste[4, 213]. They also contain salicin, a glycoside that probably decomposes into salicylic acid (aspirin) in the body[213]. The buds are antiscorbutic, antiseptic, balsamic, diaphoretic, diuretic, expectorant, febrifuge, salve, stimulant, tonic and vulnerary[4, 9, 21, 165, 238]. They are taken internally in the treatment of bronchitis and upper respiratory tract infections, stomach and kidney disorders[4, 238]. They should not be prescribed to patients who are sensitive to aspirin[238]. Externally, the buds are used to treat colds, sinusitis, arthritis, rheumatism, muscular pain and dry skin conditions[238]. They can be put in hot water and used as an inhalant to relieve congested nasal passages[213]. The buds are harvested in the spring before they open and are dried for later use[238]. The stem bark is anodyne, anti-inflammatory, antiseptic, astringent, diuretic and tonic[14, 46, 61, 178, 218]. The bark contains salicylates, from which the proprietary medicine aspirin is derived[238]. It is used internally in the treatment of rheumatism, arthritis, gout, lower back pains, urinary complaints, digestive and liver disorders, debility, anorexia, also to reduce fevers and relieve the pain of menstrual cramps[14, 46, 61, 178, 213, 238]. Externally, the bark is used to treat chilblains, haemorrhoids, infected wounds and sprains[238]. The bark is harvested from side branches or coppiced trees and dried for later use[238].

nrakta Central and southern Europe, including Britain, Mediterranean, temperate Asia to the Himalayas. ksacta Moist ground in woods and by streams[9, 17].

propta Seed - must be sown as soon as it is ripe in spring[113]. Poplar seed has an extremely short period of viability and needs to be sown within a few days of ripening[200]. Surface sow or just lightly cover the seed in trays in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the old frame. If sufficient growth is made, it might be possible to plant them out in late summer into their permanent positions, otherwise keep them in the cold frame until the following late spring and then plant them out. Most poplar species hybridize freely with each other, so the seed may not come true unless it is collected from the wild in areas with no other poplar species growing[11]. Cuttings of mature wood of the current season's growth, 20 - 40cm long, November/December in a sheltered outdoor bed or direct into their permanent positions. Very easy. Suckers in early spring[78]. This species rarely produces suckers[238].

nwatta Agroforestry Services: Living trelis Agroforestry Services: Windbreak Fodder: Bank Historic Crop Industrial Crop: Biomass Management: Coppice Management: Standard Other Systems: Irreg. Intercrop Other Systems: SRC Other Systems: Strip intercropA very easily grown plant, it does well in a heavy cold damp soil[1]. Prefers a deep rich well-drained circumneutral soil, growing best in the south and east of Britain[11, 200]. Growth is much less on wet soils, on poor acid soils and on thin dry soils[11]. It is fairly wind tolerant, though it does not do well in exposed upland sites, or in maritime exposure[11, K]. It dislikes shade and is intolerant of root or branch competition[200]. A fast-growing tree, reaching maturity in about 100 years and declining thereafter[186]. There are several named varieties that have been selected mainly for their ornamental value[11]. The leaf buds, as they swell in the spring, and the young leaves have a pleasing fragrance of balsam[245]. The fragrance is especially pronounced as the leaves unfold[245]. Very tolerant of hard pruning, the trees have often been pollarded in the past[186]. Plants seldom produce suckers[186]. An important food plant for the caterpillars of several species of butterfly[30]. Poplars have very extensive and aggressive root systems that can invade and damage drainage systems. Especially when grown on clay soils, they should not be planted within 12 metres of buildings since the root system can damage the building's foundations by drying out the soil[11]. Dioecious. Male and female plants must be grown if seed is required. Special

Features:Not North American native, Inconspicuous flowers or blooms.

4.2.180 Pinus nigra

Austrian Pine, Black Pine

3 tlin 7 cyuc 1 kcaak 0 tcan 2 dwat 30 m hkuic
htuc cyuti hgakuyctucp hwicli hysihrsjnutnyik hpa7tli flat-prikhwissip hpa7tmwatli dyat hjonli

drutta Pinus nigra is an evergreen Tree growing to 30 m (98ft) by 8 m (26ft) at the fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from May to June, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

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

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

tcanta Dye Herbicide Plaster Shelterbelt WoodA tan or green dye is obtained from the needles[168]. The needles contain a substance called terpene, this is released when rain washes over the needles and it has a negative effect on the germination of some plants, including wheat[201]. A very wind resistant tree, it can be grown as part of a shelterbelt planting[200]. Trees have proved to be very resistant to maritime exposure on our Cornwall trial grounds[K]. Resin and turpentine are obtained from the wood, they are used in ointments and plasters[46, 64, 171]. Oleo-resins are present in the tissues of all species of pines, but these are often not present in sufficient quantity to make their extraction economically worthwhile[64]. The resins are obtained by tapping the trunk, or by destructive distillation of the wood[4, 64]. In general, trees from warmer areas of distribution give the higher yields[64]. Turpentine consists of an average of 20% of the oleo-resin[64] and is separated by distillation[4, 64]. Turpentine has a wide range of uses including as a solvent for waxes etc, for making varnish, medicinal etc[4]. Rosin is the substance left after turpentine is removed. This is used by violinists on their bows and also in making sealing wax, varnish etc[4]. Pitch can also be obtained from the resin and is used for waterproofing, as a wood preservative etc. Wood - non durable. Used for rough carpentry and furniture[100].

dwatta PlasterThe turpentine obtained from the resin of all pine trees is antiseptic, diuretic, rubefacient and vermifuge[4]. It is a valuable remedy used internally in the treatment of kidney and bladder complaints and is used both internally and as a rub and steam bath in the treatment of rheumatic affections[4]. It is also very beneficial to the respiratory system and so is useful in treating diseases of the mucous membranes and respiratory complaints such as coughs, colds, influenza and TB[4]. Externally it is a very beneficial treatment for a variety of skin complaints, wounds, sores, burns, boils etc and is used in the form of liniment plasters, poultices, herbal steam baths and inhalers[4].

nrakta Europe - Austria. ksacta Mountains, often on calcareous soils[100].

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

in the autumn and dried for later use[254]. The following notes are the list of uses for P. ginseng. Ginseng has a history of herbal use going back over 5,000 years[238]. It is one of the most highly regarded of herbal medicines in the Orient, where it has gained an almost magical reputation for being able to promote health, general body vigour and also to prolong life[218]. The root is adaptogen, alterative, carminative, demulcent, emetic, expectorant, stimulant and tonic[165, 176, 178, 218]. It both stimulates and relaxes the nervous system, encourages the secretion of hormones, improves stamina, lowers blood sugar and cholesterol levels and increases resistance to disease[238]. It is used internally in the treatment of debility associated with old age or illness, lack of appetite, insomnia, stress, shock and chronic illness[238]. Ginseng is not normally prescribed for pregnant women, or for patients under the age of 40, or those with depression, acute anxiety or acute inflammatory disease[238]. It is normally only taken for a period of 3 weeks[238]. Excess can cause headaches, restlessness, raised blood pressure and other side effects, especially if it is taken with caffeine, alcohol, turpims and bitter or spicy foods[238]. The roots are harvested in the autumn, preferably from plants 6 - 7 years old, and can be used fresh or dried[238]. A dose of 10ug/ml of ginseng saponins has been shown to be significantly radio-protective when it is administered prior to gamma-irradiation[218]. The leaf is emetic and expectorant[218].

nrakta Eastern N. America - Maine to Georgia, west to Oklahoma and Minnesota. ksacta Rich cool woods[43].

propta Seed - sow in a shady position in a cold frame preferably as soon as it is ripe, otherwise as soon as the seed is obtained. It can be very slow and erratic to germinate. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a shady position in the greenhouse or frame for at least their first winter. Make sure the pots are deep enough to accommodate the roots. Plant out into their permanent positions in late summer. Division in spring.

nwatta Requires a deep moist humus rich soil in a shady position in a woodland[200]. Requires deep shade, growing well on north-facing slopes and in woodland[4, 14, 20]. Often grown as a medicinal plant[4, 57], though considered to be inferior to Korean ginseng, P. ginseng[200]. It is exported from N. America, mainly to Hong Kong[207]. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2]. The root pattern is fleshy. Thick or swollen - fibrous or tap root [1-2].

4.2.233 Geum aleppicum

Yellow Avens

3 tlin 7 cyuc 1 kcaak 0 tcan 2 dwat 0.6 m hkuic
hmimhtut cyuti tcup hwicli hrasjnutnyik hpa7tli flatprikhwissip hpa7tmwatli xre7t hjonli

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

kcakta Edible Parts: LeavesEdible Uses: Young leaves - cooked[46, 177]. Used in spring.

dwatta Anodyne Astringent Diaphoretic Febrifuge SkinThe plant is anodyne[218]. It is used in the treatment of sores, wounds and skin diseases[218]. The root is astringent, diaphoretic and febrifuge[257]. A decoction has been used in the treatment of diarrhoea, fevers, children's coughs, sore teeth and sore throats[257].

nrakta Europe, Asia, N. America. ksacta Thickets and grassy places in lowland and low mountains of N. Japan[58]. propta Seed - sow spring or autumn in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer/ Division in spring or autumn. This should be done every 3 - 4 years in order to maintain the vigour of the plant[200]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Easily grown in any moderately good garden soil that is well-drained[1]. Prefers a soil rich in organic matter[200]. Hybridizes freely with other members of this genus[200].

4.2.234 Chrysosplenium americanum

Water Mat, American golden saxifrage

3 tlin 7 cyuc 1 kcaak 2 tcan 0 dwat 0.1 m hkuic
hmimhtut cyuti tcupha7n hwicli hrasjnutnyik hpa7tli frus-flatprikhwissip hpa7tmwatli fyfxre7t hjonli

drutta Chrysosplenium americanum is a PERENNIAL growing to 0.1 m (0ft 4in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Beetles, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: Edible Uses: CondimentUsed as a spice in salads[177].

tcanta The plants creeping habit makes it a good ground cover for the bog garden[200].

nrakta Central and Western N. America - Quebec to Minnesota, south to Nova Scotia and Montana. ksacta Acid soils[200] in springheads, rills and cold wet places[43]

propta Seed - sow spring or autumn in a lightly shaded position in a cold frame. Stand the pot in 2cm of water. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a tray of water in the cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in light shade in a cold frame until they are rooting well. Plant them out in the summer or following spring.

nwatta Succeeds in most soils if they are moist. Requires a constantly wet but well-drained soil[200]. Prefers acid soils[200]. Prefers a shady position, succeeding in woodland. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A clumping mat former. Forming a dense prostrate carpet with a limited spread [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2].

4.2.235 Veronica chamaedrys

Germander Speedwell

3 tlin 7 cyuc 1 kcaak 0 tcan 1 dwat 0.5 m hkuic
hmimhtut cyuti kyuctucp hwicli hrasjnutnyik hpa7tli flat-prikhwissip hpa7tmwatli fyfxre7t hjonli

drutta Veronica chamaedrys is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from March to July. The species is hermaphrodite (has both male and

be allowed to grow on undisturbed in the pot for their first year. Apply a liquid feed during the growing season to ensure that the seedlings are well fed. Divide the young plants into individual pots when they die down in late summer and grow them on in pots in a shady position in a cold frame for at least another year before planting them out into their permanent positions when they are dormant[K]. Division in September[11]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Succeeds in almost any situation, including the dense dry shade of large trees[1, 24]. Prefers a position in semi-shade in a moderately fertile well-drained moist woodland soil[200]. Grows well in heavy clay soils. Plants are hardy to -20°C or lower[200]. A good bee plant[4]. A very ornamental plant, though it can become very invasive once it is established[200]. Plants seem to be immune to the predations of rabbits[233].

4.2.230 *Anemone narcissiflora*

Narcissus-Flowered Anemone, *Narcissus anemone*
 3 tlin 7 cyuc 1 kcaak 0 tcan 0 dwat 0.6 m hkuc
 hmimhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta *Anemone narcissiflora* is a PERENNIAL growing to 0.6 m (2ft) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in May, and the seeds ripen from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcasta Although no specific mention has been seen for this species, many members of this genus contain protoanemonin, an irritating acrid oil that is an enzymatic breakdown product of the glycoside ranunculin. While protoanemonin can cause severe topical and gastrointestinal irritation, it is unstable and changes into harmless anemonin when plants are dried or heated[4, 10, 19, 65, 270].

kcakta Edible Parts: Leaves RootEdible Uses: Leaves - raw or cooked[46, 61, 177]. The leaves , together with other salad greens and oil, were beaten to a creamy consistency and frozen into an 'ice cream'[257].Some caution is advised, see the notes above on toxicity. Root - raw[177]. The upper root ends have been used for food[257]. Some caution is advised, see the notes above on toxicity.

dwatta HaemostaticThe plant has been used as an anti-haemorrhagic[270].

nrakta Northern Europe to northern Asia. And north-western N. America. ksacta Grassy, peaty but well-drained alpine meadows, occasionally in partial shade[100, 187].

propta Seed - best sown in a cold frame as soon as it is ripe in the summer[1]. Surface sow or only just cover the seed and keep the soil moist. Sow stored seed as soon as possible in late winter or early spring. The seed usually germinates in 1 - 6 months at 15°C[133]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for at least their first year. When the plants are large enough, plant them out in the spring. Division in late summer after the plant dies down. This plant is very slow to increase[187].

nwatta Succeeds in ordinary garden soil but prefers a rich sandy loam[1] and full sun[200]. Succeeds in full sun or part shade[187]. Plants succeed in maritime gardens[233]. Hardy to about -20°C[187]. Plants seem to be immune to the predations of rabbits[233]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54]. A very ornamental[1] and highly polymorphic plant[50, 187, 270]. There are a large number of sub-species[270].

4.2.231 *Veronica officinalis*

Common Speedwell
 3 tlin 7 cyuc 1 kcaak 0 tcan 2 dwat 0.1 m hkuc
 hmimhtut cyutli kyucctup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta *Veronica officinalis* is a PERENNIAL growing to 0.1 m (0ft 4in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from May to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies, bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Edible Uses: TeaA bitter tangy tea is made from the fresh flowering herb or the dried leaves[2, 21, 46, 183]. The dried leaves can be added to tea blends[238].

dwatta Alterative Antipruritic Antirheumatic Astringent Diuretic Expectorant Stomachic TonicThe leaves and roots are alterative, astringent, mildly diuretic, mildly expectorant, stomachic and tonic[4, 9, 14, 21, 222]. They have been employed in the treatment of pectoral and nephritic complaints, haemorrhages, skin diseases and the treatment of wounds[4], though the plant is considered to be obsolete in modern herbalism[238]. The leaves are harvested in the summer and dried for later use[9].

nrakta Europe, including Britain, from Iceland south and east to Spain, W. Asia and the Caucasus. ksacta Heaths, moors, grassland, dry hedgebanks and coppices, often on dry soils[4, 17].

propta Seed - sow autumn in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. If you have sufficient quantity, the seed can be sown in situ in the autumn or the spring. Division in autumn or spring[200]. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring.

nwatta Easily grown in a moderately fertile moisture retentive well drained soil[200]. Prefers cool summers[200]. Thrives in light shade or in open sunny positions[14]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. An evergreen. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2].

4.2.232 *Panax quinquefolius*

American Ginseng
 3 tlin 7 cyuc 1 kcaak 0 tcan 3 dwat 0.3 m hkuc
 pcmhmmim cyutli tcup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Panax quinquefolius* is a PERENNIAL growing to 0.3 m (1ft) by 0.5 m (1ft 8in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in June. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: TeaA tea is made from the leaves and the roots[105, 177, 183]. The aromatic root is candied and used as a masticatory[183].

dwatta Adaptogen Cardiotoxic Demulcent Sedative Sialogogue Stimulant StomachicThis N. American species of ginseng is said to have similar properties to the Oriental ginseng, *P. ginseng*, though it is said to have a milder action and is more likely to be prescribed for younger patients[238, 254]. It is cultivated in some areas of America as a medicinal crop and is also often harvested from the wild[238]. The root is said to be adaptogen, cardiotoxic, demulcent, panacea, sedative, sialogogue, stimulant and stomachic[21, 35, 46, 147, 165, 176, 222]. It is used in the treatment of chronic cough, low-grade fever, spontaneous or night sweating and fatigue due to chronic consumptive diseases[176]. When taken over an extended period it is said to increase mental efficiency and physical performance whilst helping the body adapt to high or low temperatures and stress[222]. Some caution is advised, though, because large doses are said to raise blood pressure[222]. The root is harvested

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

nwatta Landscape Uses:Firewood, Specimen. Succeeds on all soil types, including chalk[1, 11, 200]. Thrives in a light well-drained sandy or gravelly loam[1, 11]. Dislikes poorly drained moorland soils[1]. Established plants tolerate drought[200]. Requires a sunny position[11]. A very hardy tree, it is extensively planted for timber and shelter[50, 200], tolerating maritime exposure[11, 75]. Fast growing when young, it outgrows the Corsican pine (*P. nigra maritima*) for the first 5 or 6 years but is then rapidly overtaken by that species[185]. Plants are strongly outbreeding, self-fertilized seed usually grows poorly[200]. They hybridize freely with other members of this genus[200]. Leaf secretions inhibit the germination of seeds, thereby reducing the amount of plants that can grow beneath the tree[18]. Trees tend to be short-lived in cultivation[11]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features: Not North American native, Inconspicuous flowers or blooms.

4.2.181 *Populus angustifolia*

Narrowleaf Cottonwood
 3 tlin 7 cyuc 1 kcaak 2 tcan 2 dwat 30 m hkuc
 htut cyutli tcup hwicli hrasljutnyikfriip hpa7tli flatprikliwis hpa7tmwatli nyanhjen hjonli

drutta *Populus angustifolia* is a deciduous Tree growing to 30 m (98ft 5in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Inner barkEdible Uses: Gum SweetenerInner bark[105, 161, 177] There are no more details but inner bark is often dried, ground into a powder and then used as a thickener in soups etc or added to cereals when making bread. A 'honeydew', produced on the undersides of leaves by aphids, was collected by various native North American Indian tribes and used as a sweetener[227]. The buds have been used as a chewing gum[257].

tcanta Basketry Gum Rooting hormone Soil stabilization WoodAn extract of the shoots can be used as a rooting hormone for all types of cuttings. It is extracted by soaking the chopped up shoots in cold water for a day[172]. The young shoots are used in making baskets[227, 257]. The highly developed root system helps to reduce erosion when trees are planted on banks and slopes[226]. Wood - weak, soft, rather woolly in texture, without smell or taste, of low flammability, not durable, very resistant to abrasion[11, 227]. It weighs 24lb per cubic foot[235]. The tree's scarcity and small size make it commercially unimportant, though it is sometimes used locally for fence posts and fuel[227, 229].

dwatta Analgesic Antiinflammatory Antiscorbutic Febrifuge OdontalgicA tea made from the inner bark is used in the treatment of scurvy[161]. The bark contains salicin, a glycoside that probably decomposes into salicylic acid (aspirin) in the body[213, 226, 238]. The bark is therefore anodyne, anti-inflammatory and febrifuge. It is used especially in treating rheumatism and fevers, and also to relieve the pain of menstrual cramps[238]. The woolly fruit is moistened and applied to the gums in order to treat infections[226]. A tea made from the fruits is used in the treatment of toothache[226].

nrakta Western N. America - Alberta to Mexico. ksacta Streambanks in dry mountains, foothills and dry plains[60].

propta Seed - must be sown as soon as it is ripe in spring[113]. Poplar seed has an extremely short period of viability and needs to be sown within a few days of ripening[200]. Surface sow or just lightly cover the seed in trays in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the old frame. If sufficient growth is made, it might be possible to plant them out in late summer into their permanent

positions, otherwise keep them in the cold frame until the following late spring and then plant them out. Most poplar species hybridize freely with each other, so the seed may not come true unless it is collected from the wild in areas with no other poplar species growing[11]. Cuttings of mature wood of the current season's growth, 20 - 40cm long, November/December in a sheltered outdoor bed or direct into their permanent positions. Very easy. Suckers in early spring[78].

nwatta An easily grown plant, it does well in a heavy cold damp soil[1]. Prefers a deep rich well-drained circum-neutral soil, growing best in the south and east of Britain[11, 200]. Growth is much less on wet soils, on poor acid soils and on thin dry soils[11]. It does not do well in exposed upland sites[11]. Dislikes shade, it is intolerant of root or branch competition[200]. A fast-growing but short-lived species in the wild[229]. The young leaves and expanding buds emit a pleasant distinctive fragrance in the spring[226]. Poplars have very extensive and aggressive root systems that can invade and damage drainage systems. Especially when grown on clay soils, they should not be planted within 12 metres of buildings since the root system can damage the building's foundations by drying out the soil[11]. Dioecious. Male and female plants must be grown if seed is required. Hybridizes freely with other members of this genus[200].

4.2.182 *Larix lyallii*

Sub-Alpine Larch
 3 tlin 7 cyuc 1 kcaak 0 tcan 0 dwat 25 m hkuc
 hmimhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Larix lyallii* is a deciduous Tree growing to 25 m (82ft 0in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: The shoot-tips are used as a flavouring in soups[177].

tcanta Tannin WoodThe bark contains tannin[229]. Wood - strong, heavy, hard, coarse-grained and durable[82, 229].

nrakta Western N. America - Washington to British Columbia. ksacta Sub-alpine to alpine zones, often on north-facing slopes where snow lies until late in the season[60].

propta Seed - sow late winter in pots in a cold frame. One months cold stratification helps germination[113]. It is best to give the seedlings light shade for the first year[78]. As soon as they are large enough to handle, prick out the seedlings into individual pots. Although only a few centimetres tall, they can be planted out into their permanent positions in the summer providing you give them an effective weed-excluding mulch and preferably some winter protection for their first year. Otherwise grow them on in the cold frame for their first winter and plant them out in early summer of the following year. The seed remains viable for 3 years[113] if you are growing larger quantities of plants, you can sow the seed in an outdoor seedbed in late winter. Grow on the seedlings in the seedbed for a couple of years until they are ready to go into their permanent positions then plant them out during the winter.

nwatta Prefers an open airy position in a light or gravelly well-drained soil[200]. Intolerant of badly drained soils, but tolerates acid and infertile soils[200]. Succeeds on rocky hill or mountain sides and slopes[200]. A north or east aspect is more suitable than west or south[11]. This species is very cold-hardy when fully dormant, but the trees can be excited into premature growth in Britain by mild spells during the winter and they are then very subject to damage by late frosts and cold winds[1]. Plants are not very successful in Britain, they have been tried on many occasions but have failed to make a satisfactory tree[11, 185]. A specimen at the Hillier Arboretum was 4.5 metres tall in 1970 and suffered frost damage each year[185]. This species is impossible to grow in lowland Britain, though it should succeed above a height of 300 metres in the eastern Scottish Highlands[200]. Growth is normally slow in Britain with average height increases of less than 30cm per year[185]. Hybridizes freely with other members of this genus[200]. Closely related to *L.*

occidentalis[200]. Open ground plants, 1 year x 1 year are the best for planting out, do not use container grown plants with spiralled roots[200]. Plants transplant well, even when coming into growth in the spring[200]. Plants in this genus are notably resistant to honey fungus[200].

4.2.183 Populus alba

White Poplar

3 tlin 9 cyuc 1 kcak 3 tcan 2 dwat 20 m hkuc htut cyutli kyucupc hwieli hrasljutnyikfrip hpa7tli flatprikliwis hpa7tmwattli nyanhjen hjonli

drutta Populus alba is a deciduous Tree growing to 20 m (65ft) by 12 m (39ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower in March. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Inner bark LeavesEdible Uses: Leaves - rich in Vitamin C[179]. Inner bark - dried, ground into a powder and added to flour for making bread[2, 105]. A famine food, it is only used when all else fails[177].

tcanta Dye Rooting hormone Shelterbelt WoodAn extract of the shoots can be used as a rooting hormone for all types of cuttings. It is extracted by soaking the chopped up shoots in cold water for a day[172]. A fairly wind resistant tree, it can be grown as part of a shelterbelt planting[200]. A yellow dye is obtained from the bark[100]. Wood - rather woolly in texture, without smell or taste, of low flammability, not durable, very resistant to abrasion, very light, soft, elastic. It is used for less good quality purposes such as making matches, packing materials etc[11, 13, 46, 61, 100, 115].

dwatta Alternative Anodyne Antiinflammatory Antiseptic Astringent Diuretic Febrifuge Tonic Urinary Vitamin CThe stem bark is anodyne, anti-inflammatory, antiseptic, astringent, diuretic and tonic[14, 46, 61, 178, 218]. The bark contains salicylates, from which the proprietary medicine aspirin is derived[238]. It is used internally in the treatment of rheumatism, arthritis, gout, lower back pains, urinary complaints, digestive and liver disorders, debility, anorexia, also to reduce fevers and relieve the pain of menstrual cramps[14, 46, 61, 178, 213, 238]. Externally, the bark is used to treat chilblains, haemorrhoids, infected wounds and sprains[238]. The bark is harvested from side branches or coppiced trees and dried for later use[238]. The leaves are used in the treatment of caries of teeth and bones[218]. The twigs are depurative[218].

nrakta C. Europe to Asia. Frequently planted in Britain but not naturalized[17]. ksacta Woods and watersides[100].

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

nwatta Landscape Uses:Erosion control, Aggressive surface roots possible, Specimen. An easily grown plant, it does well in a heavy cold damp soil[1]. Prefers a deep rich well-drained circumneutral soil, growing best in the south and east of Britain[11, 200]. Growth is much less on wet soils, on poor acid soils and on thin dry soils[11]. This species thrives on drier soils than other members of the genus[188]. It does not do well in exposed upland sites[11] but it is tolerant of

maritime exposure, though it can be wind pruned in such a situation[11, 200]. Dislikes shade, it is intolerant of root or branch competition[200]. Tolerates both hot and cool summers[200]. A very ornamental tree, it is fast-growing but fairly short-lived[1, 11, 227]. There are several named varieties[188]. An important food plant for the caterpillars of many species of butterflies[30]. The leaf buds are resinous and exude an aromatic perfume in the spring[245]. Poplars have very extensive and aggressive root systems that can invade and damage drainage systems. Especially when grown on clay soils, they should not be planted within 12 metres of buildings since the root system can damage the building's foundations by drying out the soil[11]. Dioecious. Male and female plants must be grown if seed is required. Hybridizes freely with other members of this genus[200]. Special Features: Not North American native, Invasive, Inconspicuous flowers or blooms.

4.2.184 Fraxinus pennsylvanica

Red Ash, Green ash, Water Ash

3 tlin 9 cyuc 1 kcak 0 tcan 1 dwat 20 m hkuc htut cyutli tcup hwieli hrasljutnyik hpa7tli flatprikliwis hpa7tmwattli nyanhjen hjonli

drutta Fraxinus pennsylvanica is a deciduous Tree growing to 20 m (65ft) by 20 m (65ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in May, and the seeds ripen in October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: Inner barkEdible Uses: Inner bark - cooked[105, 161, 177]. The cambium layer can be scraped down in long, fluffy layers and cooked[257]. It is said to taste like eggs[257]. Inner bark can also be dried, ground into a powder and then used as a thickening in soups etc or mixed with cereals when making bread.

tcanta Basketry Dye Shelterbelt WoodA fairly wind resistant tree, it can be grown as part of a shelterbelt planting[200]. A red dye is extracted from the bark[226]. Logs of wood can be beaten with mauls to separate the growth layers, these layers can then be cut into strips and woven into baskets[257]. Wood - hard, heavy, rather strong, tough, elastic, brittle, coarse-grained. It weighs 44lb per cubic foot. Used for tool handles, furniture etc[61, 82, 149, 171, 235]. The wood is of poorer quality than F. americana, though it is usually sold under that name[226].

dwatta Bitter Diuretic TonicThe bark and leaves are a bitter tonic[4, 61]. An infusion of the inner bark has been used in the treatment of depression and fatigue[257]. The root is diuretic[4].

nrakta Eastern N. America - Nova Scotia to Alberta, south to Florida and Texas. ksacta Streambanks, floodplains and wet upland sites[229], rarely in pure stands[226].

propta The seed is best harvested green - as soon as it is fully developed but before it has fully dried on the tree - and can then be sown immediately in a cold frame[80]. It usually germinates in the spring[80]. Stored seed requires a period of cold stratification and is best sown as soon as possible in a cold frame[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant them out into their permanent positions or a nursery bed in late spring or early summer of the following year. If you have sufficient seed then it is possible to sow it directly into an outdoor seedbed, preferably in the autumn. Grow the seedlings on in the seedbed for 2 years before transplanting either to their permanent positions or to nursery beds.

nwatta Landscape Uses:Aggressive surface roots possible, Pollard, Street tree. Prefers a deep loamy soil, even if it is on the heavy side[1, 200]. Most members of this genus are gross feeders and require a rich soil[11, 200]. Plants succeed when growing in exposed positions[200] and also in alkaline soils[11]. They tolerate atmospheric pollution[200]. A fast-growing tree[188]. Plants have little tolerance of shade[226].

nrakta Europe, including Britain, south and east to N. Africa, the Azores, central and western Asia. ksacta Downs, waste places and roadsides southwards from central Scotland, though perhaps only native near the south coast of England[17].

propta Seed - sow April/May or August/September in a cold frame. Germination can be slow and erratic[200]. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the following spring[K]. Basal cuttings in late spring. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer. Division in spring[1]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta White horehound is an easily grown plant that succeeds in most well-drained soils[200], though it flourishes best in a poor dry soil[1, 4]. Another report says that the plant flourishes best where there is plenty of nitrogen in the soil[274]. It prefers neutral to alkaline soil conditions[238] and requires a warm sunny position if it is to do well[14]. Often grown in the herb garden and sometimes cultivated commercially as a medicinal herb[4, 61]. If the plant is cut back after flowering it will normally produce a second crop of leaves[238]. The fresh leaves have a pronounced musky smell, though this is lost once the plant is dried[245]. A good bee plant[1]. White horehound is a good companion plant for growing near tomatoes[24]. The tomatoes crop for a longer period and also produce a heavier crop[201]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [2-1].

4.2.228 Athyrium filix

Lady Fern, Common ladyfern, Subarctic ladyfern, Asplenium ladyfern, Southern Lady Fern, Tatting Fern
3 tlin 8 cyuc 1 kcak 2 tcan 2 dwat 0.6 m hkuc pcmhmim cyutli tcup hwieli hrasljutnyikfrip hpa7tli frusflatprikliwis hpa7tmwattli hjonli

drutta Athyrium filix-femina is a deciduous Fern growing to 0.6 m (2ft) by 0.5 m (1ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 2. The seeds ripen from July to August. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

pcista The fresh shoots contain thiaminase, an enzyme that robs the body of its vitamin B complex. In small quantities this enzyme will do no harm to people eating an adequate diet that is rich in vitamin B, though large quantities can cause severe health problems. The enzyme is destroyed by heat or thorough drying, so cooking the plant will remove the thiaminase[172]. Although we have found no reports for this species, a number of ferns also contain carcinogens so some caution is advisable[200].

kcakta Edible Parts: Leaves RootEdible Uses: Young shoots, harvested before they have fully unfolded, can be eaten cooked[256]. They must not be eaten raw - see the notes above on toxicity[172]. Used in spring, they are a bitter emergency food[172]. Rhizome - peeled and slow-baked[118, 257]. Reports that the root of this plant were eaten by native North American Indians are likely to be mistaken, it was probably *Dryopteris expansa* that was used[256].

tcanta A good ground cover plant[200], forming a slowly spreading clump[208]. The cultivar 'Minor' has a denser habit and spreads more freely, making a better cover[208].

dwatta Anthelmintic Diuretic Poultrice Women's complaintsA tea of the boiled stems has been used to relieve labour pains[213, 222, 257]. The young unfurled fronds have been eaten to treat internal ailments such as cancer of the womb[257]. The roots are anthelmintic and diuretic[4, 222]. A tea of the boiled roots has been used to treat general body

pains[213, 257], to stop breast pains caused by childbirth and to induce milk flow in caked breasts[222, 257]. The dried powdered root has been applied externally to heal sores[222, 257]. A liquid extract of the root is an effective anthelmintic, though it is less powerful than the male fern, *Dryopteris felix-mas*[4].

nrakta Throughout the N. Temperate zone, including Britain, to the mountains of India, tropical S. America. ksacta Moist sheltered woods, hedgebanks and ravines[4], usually on acidic soils but also found in drier and more open habitats[187].

propta Spores - surface sow in a pot of sterile compost in a shady part of the greenhouse and keep moist, this is most easily done by putting the pot in a plastic bag. Pot up small clumps of the plants when they are large enough to handle and keep them moist until they are established. Plant out in late spring of the following year. Division in spring as plants come into growth. Larger divisions can be planted straight into their permanent positions whilst smaller clumps are best potted up and kept in a cold frame until they are growing away well.

nwatta Landscape Uses:Border, Container, Foundation, Ground cover, Massing, Woodland garden. An easily grown plant[4], it is calcifuge and prefers an acid soil with a pH from 4.5 to 6.5, but it tolerates alkaline soils if plenty of leaf mould is added[200]. Grows well in heavy clay soils. Prefers a moist sheltered site with moderately high atmospheric humidity[200]. A very ornamental [1] and polymorphic species, there are many named varieties selected for their ornamental value[187]. Members of this genus are rarely if ever troubled by browsing deer[233]. Special Features: Attractive foliage, Naturalizing, Wetlands plant. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

4.2.229 Convallaria keiskei

Lily Of The Valley

3 tlin 7 cyuc 1 kcak 0 tcan 0 dwat 0.3 m hkuc pcmhmmhtut cyutli kyucucupha7n hwieli hrasljutnyik hpa7tli flatprikliwis hpa7tmwattli fyifxre7t hjonli

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

pcista All parts of the plant are poisonous[7, 10, 19]. However, the toxic principle is very poorly absorbed when taken orally so poisoning is unlikely to occur[65].

kcakta Edible Parts: Flowers LeavesEdible Uses: TeaThe whole plant is cooked as a potherb or put in miso soup[177, 183]. Caution is advised, see the notes above on toxicity. The flowers and flower buds are preserved in salt or mixed with leaf tea and drunk[177, 183].

tcanta Plants can be grown as a ground cover in woodland shade or in a shrubbery[200].

nrakta E. Asia - China, Japan, Korea, Siberia. ksacta Highlands and mountain meadows all over Japan[58].

propta Seed - best sown as soon as it is ripe, otherwise in late winter, in a cold frame[164]. Germination, particularly of stored seed can be very slow, taking 2 - 12 months or more at 15°C[164]. Sow the seed thinly so that the seedlings can

plant, tolerating temperatures down to about -30°c[200]. Plants can be pruned back quite severely, they sprout well from the base[200]. Very stoloniferous, plants produce suckers freely[67, 200]. A very ornamental plant[67], it is closely related to *B. vulgaris*[1]. Hybridizes freely with other members of this genus[1]. The flowers are produced late in spring, thereby escaping spring frosts[67]. Special Features: Not North American native, Inconspicuous flowers or blooms.

4.2.225 *Juncus balticus*

Baltic Rush

3 tlin 7 cyuc 1 kcaak 0 tcan 0 dwat 1 m hkuc hmimhtut cyutli tucphja7nhs6s hwicli jlutnyik hpa7tli flatprklwishsons hpa7tmwatli xre7t hjonli

drutta *Juncus balticus* is a PERENNIAL growing to 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in saline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can grow in water.

pcista Although no reports of toxicity have been seen for this species, there is a report that one member of this genus is possibly toxic to mammals[76].

kcakta Edible Parts: SeedEdible Uses: Drink SweetenerA sugar forms along the top of the plant. This can be gathered and eaten as candy[257]. Seed[257]. No more details are given but the seed is very small[K]. The stems are used to make a fermented drink[257].

tcanta WeavingThe stems are used in making woven baskets, thatching, weaving mats etc[212, 257]. The basal portions of the stems have been used as a light yellow-brown decoration on baskets[257].

nrakta N. Europe, Northern N. America, N. Asia in boreal areas. ksacta Damp to wet soils, usually in saline conditions[212].

propta Seed - surface sow in pots in a cold frame in early spring and keep the compost moist. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer if they have grown sufficiently, otherwise in late spring of the following year. Division in spring. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Easily grown in a moist soil, bog garden or shallow water[1, 200]. Prefers a heavy soil in sun or light shade[200]. Plants can form large clumps and spread aggressively at the roots[200, 212].

4.2.226 *Panax trifolius*

Ground Nut, Dwarf ginseng

3 tlin 7 cyuc 1 kcaak 0 tcan 2 dwat 0.2 m hkuc pcmihmim cyutli tucp hwicli hrasjlutnyik hpa7tli flatprklwis hpa7tmwatli xre7t hjonli

drutta *Panax trifolius* is a PERENNIAL growing to 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 3. It is in leaf from April to June, in flower in April. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Root-cooked[57, 63]. A very palatable taste after being boiled[183]. When cold it has a taste somewhat like nuts[183].

dwatta MiscellanyAlthough closely related to the well-known herbal medicine ginseng, this species has been little researched for its medicinal virtues[222]. A tea made from the whole plant has been used in the treatment of colic, indigestion, gout, hepatitis etc[222]. The root is analgesic[257]. It has been chewed as a treatment for headache, short breath, fainting and nervous debility[222, 257].

nrakta Eastern N. America - Nova Scotia to Pennsylvania, west to Georgia, Indiana, Iowa and Minnesota. ksacta Rich woods and damp clearings[43].

propta Seed - sow in a shady position in a cold frame preferably as soon as it is ripe, otherwise as soon as the seed is obtained. It can be very slow and erratic to germinate. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a shady position in the greenhouse or frame for at least their first winter. Make sure the pots are deep enough to accommodate the roots. Plant out into their permanent positions in late summer. Division in spring.

nwatta Requires a moist humus-rich soil in a shady position in a woodland[1, 200]. The plant has leaves above the ground for only two months each year[222]. Although plants are hermaphrodite, individual flowers are often male[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is tuberous with swollen potato-like roots [1-2].

4.2.227 *Marrubium vulgare*

White Horehound, Horehound

3 tlin 7 cyuc 1 kcaak 3 tcan 3 dwat 0.5 m hkuc htut cyutli kyuctcup hwicli hyishrasjlutnyik hpa7tli flatprklwis hpa7tmwatli fyfxre7t hjonli

drutta *Marrubium vulgare* is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from June to November, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

pcista Heart rhythm, blood pressure, and blood glucose levels affected by large doses. Avoid during pregnancy and breast feeding. Diabetes mellitus patients on allopathic medication to lower blood sugar should avoid [301].

kcakta Edible Parts: Edible Uses: Condiment TeaThe leaves are used as a seasoning[27]. Bitter and pungent, they are sometimes used to flavour herb beer or liqueurs[4, 183]. Horehound ale is a fairly well-known drink made from the leaves[4, 238]. A mild pleasantly flavoured tea is made from the fresh or dried leaves[183], it is a favourite cough remedy[4, 46].

tcanta Companion Essential RepellentAn essential oil is obtained from the plant and used as a flavouring in liqueurs[46]. The plant has been used as a cure for cankerworm in trees[238]. No more details are given but it is probably a strong infusion of the flowering shoots, or the essential oil, that is used[K]. The growing plant repels flies[201].

dwatta Antidiarrhoeal Antidote Antiflatulent Antiseptic Antispasmodic Appetizer Cholagogue Diaphoretic Digestive Diuretic Emmenagogue Expectorant Hepatic Stimulant TB TonicWhite horehound is a well-known and popular herbal medicine that is often used as a domestic remedy for coughs, colds, wheeziness etc[4, 254]. The herb apparently causes the secretion of a more fluid mucous, readily cleared by coughing[254]. The leaves and young flowering stems are antiseptic, antispasmodic, cholagogue, diaphoretic, digestive, diuretic, emmenagogue, strongly expectorant, hepatic, stimulant and tonic[4, 7, 9, 21, 165, 238]. Horehound is a very valuable pectoral, expectorant and tonic that can be safely used by children as well as adults[4]. It is often made into a syrup or candy in order to disguise its very bitter flavour, though it can also be taken as a tea[4]. As a bitter tonic, it increases the appetite and supports the function of the stomach[254]. It can also act to normalize heart rhythm[254]. The plant is harvested as it comes into flower and can be used fresh or dried[238]. The root is a remedy for the bite of rattlesnakes, it is used in equal portions with *Plantago lanceolata* or *P. major*[207]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve *Marrubium vulgare* for dyspepsia, loss of appetite (see [302] for critics of commission E).

Cultivated as a timber tree in C. and S.E. Europe where it is sometimes naturalized[50]. The cultivar 'Patmore' is disease resistant[188]. Dioecious. Male and female plants must be grown if seed is required. Special Features:North American native, Attracts butterflies, Inconspicuous flowers or blooms.

4.2.185 *Carpinus caroliniana*

American Hornbeam, Blue Beech, Ironwood, American Hornbeam

3 tlin 9 cyuc 1 kcaak 0 tcan 1 dwat 12 m hkuc hmimhtut cyutli tucp hwicli hrasjlutnyikfrip hpa7tli flatprklwislipp hpa7tmwatli hjonli

drutta *Carpinus caroliniana* is a deciduous Tree growing to 12 m (39ft) by 10 m (32ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to May, and the seeds ripen in November. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

tcanta WoodWood - heavy, close grained, very hard, strong, but not very durable in the soil. It weighs 45lb per cubic foot. Too small to be exploited commercially, this high quality wood is often used locally for flooring, cogs, tool handles, golf clubs etc[46, 61, 82, 171, 226, 227, 229, 235]. It is especially suitable for making levers[171] and is also a good fuel[61].

dwatta AstringentAmerican hornbeam was employed medicinally by some native North American Indian tribes, though it is not used in modern herbalism[257]. The inner bark is astringent[257]. An infusion has been used in the treatment of diarrhoea and difficult urination with discharge[257].

nrakta Eastern N. America - Nova Scotia to Ontario, south to Florida and Texas. ksacta Usually found as an understory tree in rich woods and the borders of streams and swamps in deep rich moist soils[43, 82, 229].

propta Seed - best sown in an outdoors seedbed as soon as it is ripe[78]. Germination is usually good, though it may take 18 months[80]. If collected whilst still 'green' (after the seed is ripe but before it has dried fully on the plant) and sown immediately it should germinate in the following spring[80]. Grow the plants on for two years in the seedbed and then plant them out into their permanent positions in the winter. The average seed viability is around 65%[98]. Pre-treat stored seed with 4 weeks warm and 12 weeks cold stratification and sow in a cold frame[98]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame until they are at least 15cm tall before planting them into their permanent positions.

nwatta Landscape Uses:Espalier, Pest tolerant, Hedge, Standard, Superior hedge, Specimen, Street tree, Woodland garden. Thrives in any good loam, including chalk, it does not demand much light[1, 11]. Prefers a deep open loam[1]. Grows well in heavy clay soils. A slow-growing and short-lived tree in the wild[229], it is slower growing than *C. betulinus* in cultivation[11]. Seed production is cyclic, a year of heavy yields being followed by 2 - 4 years of low yields[229]. Special Features: North American native, Attracts butterflies, Inconspicuous flowers or blooms.

4.2.186 *Phellodendron amurense*

Amur Cork Tree, Chinese Corktree

3 tlin 8 cyuc 1 kcaak 0 tcan 3 dwat 12 m hkuc htut cyutli tucp hwicli hrasjlutnyik hpa7tli flatprklwislipp hpa7tmwatli nyanhjen hjonli

drutta *Phellodendron amurense* is a deciduous Tree growing to 12 m (39ft) by 15 m (49ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in June, and the seeds ripen from September to October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one

plant so both male and female plants must be grown if seed is required). . The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers moist soil.

pcista High doses can cause nausea and vomiting. Avoid with spleen and stomach disorders. Avoid during pregnancy as high berberine content [301]

kcakta Edible Parts: Fruit OilEdible Uses: OilFruit[105, 177]. The fruit is about 1cm in diameter and has a strong scent of turpentine[200].

tcanta Cork Dye Insecticide Oil WoodA yellow dye is obtained from the inner bark[178]. An oil obtained from the seed has insecticidal properties similar to pyrethrum[57]. Wood - heavy, hard, strong, close grained. Used for furniture[74]. The bark is a cork substitute[74].

dwatta Antibacterial Bitter Cholagogue Diuretic Dysentery Expectorant Hypoglycaemic Ophthalmic Skin Stomachic Urinary VasodilatorAmur cork tree, called Huang Bai in China, is commonly used in Chinese herbalism, where it is considered to be one of the 50 fundamental herbs, but one that should be used with care[218, 254]. A strongly bitter remedy, the bark acts strongly on the kidneys and is regarded as a detoxicant for hot damp conditions[238]. Recent research has shown that the plant is useful in the treatment of meningitis and conjunctivitis[254]. Huang Bai should only be used under professional supervision and should not be taken during pregnancy[254]. The bark is alternative, antibacterial, antirheumatic, aphrodisiac, bitter stomachic, cholagogue, diuretic, expectorant, febrifuge, hypoglycaemic, ophthalmic, skin, vasodilator and tonic[4, 61, 174, 176, 178, 218, 238, 279]. It is taken internally in the treatment of acute diarrhoea, dysentery, jaundice, vaginal infections including *Trichomonas*, acute urinary tract infections, enteritis, boils, abscesses, night sweats and skin diseases[238, 254]. It is commonly used in conjunction with *Scutellaria baicalensis* and *Coptis chinensis* in a preparation called 'injection of three yellow herbs' [238]. It is given intramuscularly for upper respiratory tract infections[238]. The bark of 10 year old trees is harvested in the winter or spring and dried for later use[238, 254]. The fruit is expectorant[218].

nrakta E. Asia - N. China and Manchuria. ksacta Forests in valleys and on mountains[74].

propta Seed - best sown in the autumn in a cold frame[200]. Stored seed requires 2 months cold stratification, sow in late winter in a cold frame[78, 113]. Germination is usually good. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the cold frame for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame. Pot up in autumn and over winter in a cold frame. Fair to good percentage[78]. Root cuttings - obtain in December and store in leafmold in a warm place for 3 weeks. Cut into 4cm lengths and plant horizontally in pots. Grow on in a warm greenhouse. Good percentage[78].

nwatta Landscape Uses:Pest tolerant, Specimen, Street tree. Prefers a moisture retentive well-drained deep rich loam in full sun[11, 200]. Prefers a neutral to alkaline soil[238]. Succeeds in shallow chalky soils[245]. Grows best in areas with long hot summers[200]. Plants are gross feeders and require a rich soil if they are to perform well[11]. Dormant plants are fully hardy in Britain[188], but the young growth is liable to damage from late spring frosts[11, 188, 200]. The leaves are aromatic[188]. This species is occasionally cultivated for timber in S.E. Europe[50]. Dioecious. Male and female plants must be grown if seed is required. Special Features:Not North American native, Naturalizing, Inconspicuous flowers or blooms.

4.2.187 *Acer ginnala*

Amur Maple

3 tlin 8 cyuc 1 kcaak 3 tcan 0 dwat 10 m hkuc hmimhtut cyutli tucp hwicli hrasjlutnyikfrip hpa7tli flatprklwis hpa7tmwatli xre7t hjonli

drutta *Acer ginnala* is a deciduous Tree growing to 10 m (32ft) by 8 m (26ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in flower in May, and

the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

ksakta Edible Parts: Edible Uses: TeaThe young leaves are used as a tea substitute[177, 183].

tcanta Dye Preservative TanninThe leaves are packed around apples, rootcrops etc to help preserve them[18, 20]. Black, blue and brown dyes are obtained from the dried leaves[151]. The leaves contain the dyestuff quercetin[223]. They also contain about 30% tannin[223].

nrakta E. Asia - China, Japan, Manchuria. ksakta Found in many habitats in Korea, especially along streambanks and swampy places[151]. Forests at elevations of 100 - 800 metres in China[266].

propta Seed of garden origin rarely comes true to type. The seed is best sown as soon as it is ripe in a cold frame, it usually germinates in the following spring. Pre-soak stored seed for 24 hours and then stratify for 2 - 4 months at 1 - 8°C. It can be slow to germinate. The seed can be harvested 'green' (when it has fully developed but before it has dried and produced any germination inhibitors) and sown immediately. It should germinate in late winter. If the seed is harvested too soon it will produce very weak plants or no plants at all[80, 113]. When large enough to handle, prick the seedlings out into individual pots and grow them on until they are 20cm or more tall before planting them out in their permanent positions. Layering, which takes about 12 months, is successful with most species in this genus. Cuttings of young shoots in June or July. The cuttings should have 2 - 3 pairs of leaves, plus one pair of buds at the base. Remove a very thin slice of bark at the base of the cutting, rooting is improved if a rooting hormone is used. The rooted cuttings must show new growth during the summer before being potted up otherwise they are unlikely to survive the winter.

nwatta Of easy cultivation, it prefers a good moist well-drained soil on the acid side[11, 182]. Prefers a sunny position but tolerates some shade[11, 200]. Grows well in heavy clay soils. Chlorosis can sometimes develop as a result of iron deficiency when the plants are grown in alkaline soils, but in general maples are not fussy as to soil pH. A very ornamental tree[1], there are some named varieties[11]. The form 'Bailey Compact' is a compact form originating in N. America. Very closely related to and possibly only a ssp. of *A. tataricum*[11]. The dried leaves are exported to China in large quantities for their use as a dye[151]. Most maples are bad companion plants, inhibiting the growth of nearby plants[18, 20].

4.2.188 Acer truncatum

Shantung Maple, Purplelobed Maple

3 tlin 8 cyuc 1 kcaak 0 tcan 0 dwat 8 m hkuc hmimhtut cyutli tcup hwicli hrasljutnyikfrp hpa7tli flatprik-lwis hpa7tmwatli hjonli

drutta *Acer truncatum* is a deciduous Tree growing to 8 m (26ft 3in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in April, and the seeds ripen from August to September. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

ksakta Edible Parts: SeedEdible Uses: Seed - roasted[105, 177]. Rather small and fiddly to utilize[K].

tcanta Companion PreservativeThe leaves are packed around apples, rootcrops etc to help preserve them[18, 20].

nrakta E. Asia - N. China, Korea, Manchuria. ksakta Deciduous oak forests at elevations of 400 - 1000 metres in China[266].

propta Seed - best sown as soon as it is ripe in a cold frame, it usually germinates in the following spring. The seed of this species has hypogeal germination, that is the true seed leaves remain below the soil and the first leaves to appear above soil level are true leaves. Pre-soak stored seed for 24 hours and then stratify for 2 - 4 months at 1 - 8°C. It

can be slow to germinate. The seed can be harvested 'green' (when it has fully developed but before it has dried and produced any germination inhibitors) and sown immediately. It should germinate in late winter. If the seed is harvested too soon it will produce very weak plants or no plants at all[80, 113]. When large enough to handle, prick the seedlings out into individual pots and grow them on until they are 20cm or more tall before planting them out in their permanent positions. Layering, which takes about 12 months, is successful with most species in this genus. Cuttings of young shoots in June or July. The cuttings should have 2 - 3 pairs of leaves, plus one pair of buds at the base. Remove a very thin slice of bark at the base of the cutting, rooting is improved if a rooting hormone is used. The rooted cuttings must show new growth during the summer before being potted up otherwise they are unlikely to survive the winter.

nwatta Landscape Uses:Container, Standard, Specimen, Street tree. Of easy cultivation, it prefers a good moist well-drained soil[11] and a sunny position but tolerates some shade[11, 200]. Grows well in heavy clay soils. Chlorosis can sometimes develop as a result of iron deficiency when the plants are grown in alkaline soils, but in general maples are not fussy as to soil pH. Plants produce prodigious root growth but little top growth in first year from seed[133]. This species is closely related to *A. mono*[11]. Most maples are bad companion plants, inhibiting the growth of nearby plants[18, 20]. Special Features:Not North American native, Inconspicuous flowers or blooms.

4.2.189 Euonymus europaeus

Spindle Tree, European spindle tree

3 tlin 7 cyuc 1 kcaak 3 tcan 2 dwat 6 m hkuc hmimhtut cyutli kyuctup hwicli hrasljutnyik hpa7tli flatprik-lwisliip hpa7tmwatli xre7t hjonli

drutta *Euonymus europaeus* is a deciduous Shrub growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from May to June, and the seeds ripen from September to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Poisonous. No further details.

ksakta Edible Parts: Manna OilEdible Uses: Colouring OilAn edible yellow dye is obtained from the fruit and seed[46, 61, 103, 183]. Pink from the fruit case, orange from the seed[141]. These reports should be treated with some caution since many members of this genus are poisonous. One report suggests that the plant is a source of a manna[183], there are no further details.

tcanta Charcoal Dye Insecticide Latex Oil Parasiticide WoodThe whole plant yields a volatile oil that is used in soap making[13, 46]. Other reports say that the oil is obtained from the seed[46, 61, 103, 115]. It is possible that there are two oils, an essential oil from the plant and an oil from the seed[K]. A good yellow dye is obtained from the fleshy coating around the seeds[4]. This becomes green with the addition of alum, but unfortunately both colours are rather fugitive[4]. The baked and powdered berries are used to remove lice from the hair[6, 19, 66], they are also used as an insecticide[15]. The leaves are used[115]. Roots yield up to 4% gutta-percha, a non elastic rubber used as an electrical insulation and for making plastics[74]. Wood - very hard, easily split, fine-grained, not durable[4, 6, 13, 46]. Used for spindles, skewers, knitting needles, toothpicks, carving etc[6, 100, 103]. A high quality charcoal is obtained from the wood, it is used by artists[46, 74, 103, 115].

dwatta Alternative Chologogue Hepatic Laxative Parasiticide Purgative Stimulant TonicThe bark is alterative, chologogue, hepatic, laxative, stimulant and tonic[4, 7]. The root bark is the part normally used, though bark from the stems is sometimes employed as a substitute[4]. In small doses it stimulates the appetite, in larger doses it irritates the intestines[4]. The bark is especially useful in the treatment of liver disorders which follow or accompany fevers[4]. The seeds are strongly emetic and purgative[4]. The fresh leaves, and the dried fruit and seeds, are used externally to treat

February to October, in flower from July to August, and the seeds ripen from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The whole plant is highly toxic, acting especially on the nerve centres. At first it stimulates the central and peripheral nervous system and then paralyzes it. Other symptoms of poisoning include a burning sensation on the tongue, vomiting, stomach pain and diarrhoea. Simple skin contact with the plant has caused numbness in some people[4, 7, 9, 10, 14, 19, 65, 76, 244]. The root contains 90% more poison than the leaves[232].

ksakta Some reports suggest the root is edible if cooked[2, 177], but these should be treated with extreme caution due to the highly toxic nature of the plant[K].

dwatta Analgesic Anodyne Antirheumatic Diaphoretic Diuretic Febriifuge Homeopathy Irritant SedativeAconite has been used since ancient times, especially as an antidote to poisoning[244]. Since the entire plant is itself very toxic, however, any use should be under the guidance of a skilled practitioner[4]. All parts of the plant are used medicinally. The root is the most important and this is harvested as soon as the plant dies down in the autumn and is dried before use[4]. The other parts of the plant are less important and are used fresh, being harvested when the plant is coming into flower[4]. The root is analgesic, anodyne, antirheumatic, diaphoretic, diuretic, irritant and sedative[4, 7, 9, 165, 200]. Due to its poisonous nature, it is not normally used internally though it has been used in the treatment of fevers[200]. Externally, it is applied to unbroken skin in the treatment of rheumatism, painful bruises, neuralgia etc[200, 254]. All parts of the plant, except the root, are harvested when the plant is in flower and used to make a homeopathic medicine[232]. This is analgesic and sedative and is used especially in the treatment of fevers, inflammation, bronchitis, neuralgia etc[9, 232].

nrakta Most of Europe, including Britain, east to N. W. Asia and the Himalayas. ksakta Damp shady places and moist rich meadows in southern Wales and south-western England[7, 13, 31, 165, 176]. It is usually found in calcareous soils[9].

propta Seed - best sown as soon as it is ripe in a cold frame[111]. The seed can be stratified and sown in spring but will then be slow to germinate[133]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer. Division - best done in spring but it can also be done in autumn[1, 111]. Another report says that division is best carried out in the autumn or late winter because the plants come into growth very early in the year[233].

nwatta Landscape Uses:Border, Container, Massing, Woodland garden. Thrives in most soils and in the light shade of trees[1]. Grows well in heavy clay soils. Prefers a moist soil in sun or semi-shade[200]. Plants only thrive in a sunny position if the soil remains moist throughout the growing season[238]. Prefers a calcareous soil. Tolerates a pH in the range 4.5 to 7.5. Plants take 2 - 3 years to flower when grown from seed[244]. Grows well in open woodlands[1, 4]. The flowers are very attractive to bees[244]. Members of this genus seem to be immune to the predations of rabbits and deer[233]. Although the plant is a perennial, individual roots only live for one year and die after flowering. Each root produces a number of 'daughter' roots before it dies and these can be used for propagating the plant[4]. A greedy plant, inhibiting the growth of nearby species, especially legumes[54]. An aggregate species which is divided by some botanists into many species[17, 76]. Special Features:Not North American native, Naturalizing, All or parts of this plant are poisonous, Suitable for cut flowers.

4.2.223 Carex aquatilis

Water sedge, Sitka sedge

3 tlin 7 cyuc 1 kcaak 0 tcan 0 dwat 1 m hkuc hmimhtut cyutli tucpha7n hwicli hrasljutnyik hpa7tli flatprik-lwis hpa7tmwatli hjonli

drutta *Carex aquatilis* is an evergreen Perennial growing to 1 m (3ft 3in) by 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in leaf all year; in flower in July, and the seeds ripen from July to August. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

ksakta Stem bases - raw[257].

nrakta Northern Europe, including Britain, from Norway to Sweden, Finland, N. Russia and Siberia. ksakta Margins of lake and streams in mountainous districts in west and northern Britain[17].

propta Seed - sow in situ in the spring in a moist soil in light shade. If seed is in short supply it can be sown in a cold frame and be planted out in the summer. The seed usually germinates in 2 - 6 weeks at 15°C[138]. Division in spring[200]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the summer or following spring.

nwatta Easily grown in a damp to wet soil in full sun or shade[162, 200]. Members of this genus are rarely if ever troubled by browsing deer[233].

4.2.224 Berberis koreana

Korean Lycium, Barberry

3 tlin 7 cyuc 1 kcaak 0 tcan 2 dwat 1.5 m hkuc hmimhtut cyutli kyuctup hwicli hyishrasljutnyikfrp hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta *Berberis koreana* is a deciduous Shrub growing to 1.5 m (5ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

ksakta Edible Parts: Fruit LeavesEdible Uses: Fruit - raw or cooked. The fruits are about 5mm long[200]. Young leaves - cooked[177].

tcanta DyeA yellow dye is obtained from the root.

dwatta Antibacterial Cancer DysenteryBerberine, universally present in rhizomes of *Berberis* species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with *Glycyrrhiza* species (Licorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta E. Asia - Korea. ksakta Hedgerows, ledges and montibus[11, 67].

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78]. Suckers, removed in late autumn/early winter and planted out in situ or potted up and planted out in late spring[200].

nwatta Landscape Uses:Erosion control, Pest tolerant, Hedge, Massing, Screen, Superior hedge, Woodland garden. Prefers a warm moist loamy soil and light shade but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. A very hardy

both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers Fruit Leaves**Edible Uses:** CondimentLeaves and young shoots - cooked and used as a vegetable[183]. A famine food, they are only used when all else fails[179]. They can also be used as a condiment[46, 61, 183]. Fruits and flowers are said to be edible[177, 183] but no further details are given. The fruit is very small[200].

nrakta E. Asia - China, Japan. Naturalized in Holland. **ksacta** Sunny grassy hills and at low altitudes in mountains all over Japan[58, 187]. Damp woodland margins, wet ravines and grassy mountain slopes at elevations of 300 - 2100 metres in China[266].

propta Seed - sow autumn in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn[200]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Landscape Uses:Border, Container, Ground cover, Massing, Specimen, Woodland garden. An easily grown plant, succeeding in a moist loamy soil[1]. Grows well in heavy clay soils. Succeeds in sun or semi-shade[188]. Hardy to about -25°C[187]. Most species in this genus seem to be immune to the predations of rabbits[233]. Succeeds in a woodland or semi-wild garden, it often spreads wildly[200]. **Special Features:**Not North American native, Invasive, Naturalizing, Attracts butterflies, Suitable for cut flowers.

4.2.220 Symphoricarpos occidentalis

Wolfberry, Western snowberry
3 tlin 7 cyuc 1 kcaak 0 tcan 1 dwat 1.8 m hkuc
pcimhmhtut cyutli kyuctcup hwicli hyishrasjlutnyikfrp hpa7tli flatprklwis hpa7tmwatli xre7t hjonli

drutta *Symphoricarpos occidentalis* is a deciduous Shrub growing to 1.8 m (6ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from June to July, and the seeds ripen from September to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate maritime exposure. It can tolerate atmospheric pollution.

pcista No report of toxicity has been seen for this species but the fruit of many if not all members of this genus contains saponins. Although toxic, these substances are very poorly absorbed by the body and so tend to pass through without causing harm. They are also destroyed by thorough cooking. Saponins are found in many plants, including several that are often used for food, such as certain beans. It is advisable not to eat large quantities of food that contain saponins but it would take extremely large doses of many kilos of fruit from this plant in order to produce toxic symptoms[65]. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K].

kcakta Edible Parts: Fruit**Edible Uses:** Fruit - raw or cooked[161]. Inspid. They are best if cooked. A famine food, they are only used when all else fails[177, 257]. The fruit is about 8mm in diameter[200]. See the notes at top of page regarding possible toxicity.

tcanta Broom Hedge Hedge Soil stabilizationPlants have extensive root systems and are used to stabilize soils on banks and slopes[200]. The branches can be made into brooms[257]. Very tolerant of trimming, it can be grown as a medium to tall hedge[200].

dwatta Birthing aid OphthalmicAn infusion of the leaves has been used as a wash for weak and inflamed eyes[257]. An infusion of the root has been used to cleanse the afterbirth and aid in convalescence[257].

nrakta Western N. America - Illinois, Michigan and Minnesota to British Columbia, Kansas and Colorado. **ksacta** Bluffs, dry prairies and plains[43], mainly in the Rockies[11].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed requires 3 months warm then 5 months cold stratification[98]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame[113]. Cuttings of mature wood of the current year's growth, 15 - 25cm long preferably with a heel, in a sheltered bed outdoors in winter. High percentage[78, 200]. Division of suckers in winter. They can be planted out direct into their permanent positions.

nwatta Tolerates most soils and conditions, including poor soils and amongst the roots and under the drip of trees[11, 200]. Grows well in heavy clay soils. Prefers a well-drained soil[200]. Does well in sun or shade[11]. Tolerates urban pollution and maritime exposure[200]. A very hardy plant, tolerating temperatures down to about -40°C[200]. Plants in this genus are notably resistant to honey fungus[200].

4.2.221 Hypericum ascyron

Great Saint John's Wort
3 tlin 7 cyuc 1 kcaak 0 tcan 2 dwat 1.5 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprklwis hpa7tmwatli fyfxre7t hjonli

drutta *Hypericum ascyron* is a PERENNIAL growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves**Edible Uses:** TeaYoung leaves, shoot tips and flowering buds - cooked[105, 177]. The leaves are a tea substitute[177].

dwatta Depurative Emmenagogue Febrifuge Poulitce Stings VD VulneraryThe fruit is emmenagogue and is also used to treat skin complaints and gonorrhoea[218]. The whole plant is depurative, febrifuge, poulitce and vulnerary[147, 218]. A decoction is used in the treatment of boils and abscesses, headaches and stomach ache and vomiting[147]. The root is considered to be specific for use in treating the first stages of consumption[257]. A powder made from the boiled root has been applied as a poultice to draw the poison out of a snake bite[257].

nrakta N. America - Quebec to Manitoba, south to Kansas, Iowa and Missouri. E. Asia. **ksacta** Grassy places in the mountains of N. Japan[58].

propta Seed - sow spring in a greenhouse and only just cover the seed. The seed usually germinates in 1 - 3 months at 10°C. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Easily grown in any reasonably good well-drained but moisture retentive soil[1]. Succeeds in sun or semi-shade but flowers better in a sunny position[200].

4.2.222 Aconitum napellus

Aconite, Venus' chariot, Wolfsbane Garden, Monk's Hood Garden

3 tlin 8 cyuc 1 kcaak 0 tcan 2 dwat 1.5 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyikfrp hpa7tli frusflat-prklwisslip hpa7tmwatli xre7t hjonli

drutta *Aconitum napellus* is a PERENNIAL growing to 1.5 m (5ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf from

scabies, lice (head, body or pubic), ticks and other skin parasites[268].

nrakta Europe, including Britain, from Sweden south and east to Spain, the Caucasus and W. Asia. **ksacta** Woods, scrub and hedges, usually on calcareous soils[9, 17].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed requires 8 - 12 weeks warm followed by 8 - 16 weeks cold stratification and can then be sown in a cold frame[98]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. One report says that the seed can be sown in an outdoors seedbed in early spring with good results[78]. Grow the seedlings on for two years in the seedbed before planting them out into their permanent positions. Cuttings of half-ripe wood, 5 - 8cm long taken at a node or with a heel, July/August in a frame. Very easy[78]. Cuttings of mature wood, November in a frame[113]. Layering in July/August. Takes 14 months[78].

nwatta An easily grown plant, it thrives in almost any soil, including chalk, and is particularly suited to dry shaded areas[200]. Prefers a well-drained loamy soil[1]. If cultivated for its latex it is best grown in a dry open position[74]. A very cold-hardy plant, tolerating temperatures down to about -25°C[184]. A very ornamental plant, there are many named varieties[11]. This species is often damaged by caterpillars during the flowering season[11]. It is a favoured home for blackfly, so should not be grown near broad beans[121]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

4.2.190 Syringa vulgaris

Lilac, Common lilac
3 tlin 7 cyuc 1 kcaak 0 tcan 1 dwat 6 m hkuc
htut cyutli tcup hwicli hrasjlutnyikfrp hpa7tli prklwisslip hpa7tmwatli xre7t hjonli

drutta *Syringa vulgaris* is a deciduous Shrub growing to 6 m (19ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in May, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Flowers**Edible Uses:** Flowers - raw or folded into batter and fried to make fritters[183].

tcanta Dye Essential Hedge Hedge RootstockAn essential oil is obtained from the flowers. Used in perfumery[171]. A green dye is obtained from the flowers[168]. Green and brown dyes can be obtained from the leaves[168]. A yellow-orange dye is obtained from the twigs[168]. Plants can be grown as an informal hedge[200]. The plant is often used as a rootstock for the various ornamental cultivars of lilac. Its main disadvantage is that it can sucker very freely[200].

dwatta Antiperiodic Febrifuge Mouthwash Tonic VermifugeThe leaves and the fruit are antiperiodic, febrifuge, tonic and vermifuge[4]. The bark or leaves have been chewed by children as a treatment for sore mouth[257].

nrakta E. Europe. Occasionally naturalized in Britain[17]. **ksacta** Scrub on rocky hill slopes in Europe[50]. Found in hedges, thickets and shrubberies in Britain[17].

propta Seed - sow March in a north facing cold frame. Pre-treating the seed with 4 weeks warm then 3 weeks cold stratification improves germination. It is probable that sowing the seed as soon as it is ripe in a cold frame would be a more reliable method[K]. Prick the seedlings out into individual pots once they are large enough to handle. Plant them out in the summer if sufficient growth has been made, otherwise grow them on in a cold frame for their first winter and plant out in late spring of the following year. Cuttings of young shoots, 7cm with a heel, June in a frame[200]. Cuttings of half-ripe wood, 7cm with a heel, July/August in

a frame[200]. Layering in spring before new growth begins. Takes 12 months[78]. Division of suckers in late winter. They can be planted straight out into their permanent positions.

nwatta Landscape Uses:Border, Standard, Seashore, Specimen. Succeeds in most soils, including chalk, but dislikes acid soils[11]. Prefers a deep stiff well-drained loam in a warm sunny position[11, 200]. A very ornamental plant[1], it does tend to sucker quite freely though[200]. There are many named varieties, developed for their ornamental value[182]. The flowers attract butterflies and moths[30]. Plants in this genus are notably susceptible to honey fungus[200]. **Special Features:** Not North American native, Fragrant flowers, Blooms are very showy.

4.2.191 Prunus cerasus

Sour Cherry
3 tlin 7 cyuc 1 kcaak 3 tcan 2 dwat 6 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatprklwis hpa7tmwatli fyfxre7t hjonli

drutta *Prunus cerasus* is a deciduous Tree growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in May, and the seeds ripen in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: Fruit Oil Oil Seed**Edible Uses:** Gum Gum Oil Oil TeaFruit - raw or cooked[1, 2, 5, 11, 12]. Pleasantly acid, the fruit can be eaten out of hand, used in pies, preserves etc or dried for later use[183]. The fruit is about 18mm in diameter and contains one large seed[200]. Seed - raw or cooked. Do not eat the seed if it is too bitter - see the notes above on toxicity. An edible oil is obtained from the seed[46, 61]. When refined it is used as a salad oil[183]. The leaves are used as a tea substitute[46, 61, 183]. A gum obtained from the trunk is used for chewing[61, 64].

tcanta Adhesive Dye Gum Gum Hedge Hedge Oil Oil WoodAgroforestry Uses: Plants can be grown as a hedge[50], succeeding in fairly exposed positions[K]. An excellent nectar plant, yielding both nectar and pollen[74]. **Other Uses:** An edible drying oil obtained from the seed is also used in cosmetics[61]. Seeds contain an almond-flavoured fatty oil (24 - 35%) which rapidly becomes more bitter; this is used in the manufacture of soap and is suitable for burning. The oil contains a large quantity of amygdalin[74]. The stones are used as well: according to American data, 1,000 tons of stones yields 448 tons of kernels which can yield to 96,235.5 kg (95,563 liters) of syrup, 22,736 liters of spirits, 338,130 liters of gum, 200 tons of powder, 3 tons of essential oil, and 4.134 tons of fatty oil[74]. The gum obtained from the stem can be used as an adhesive[61 , 64]. It is used in the manufacture of cloth[74] (as a size?). A green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168]. The plant can be used as a rootstock for cultivated cherries[74]. The plant is used in breeding programmes for the sweet cherry. The bark contains 5 - 7% tannins, including some quercetin[74]. The yellowish red wood is compact, rather heavy. It is suitable for use in woodwork and lathework for making pipes, cigarette holders, hoops for barrels etc[74].

dwatta Astringent Bitter Febrifuge Nervine SalveThe bark is astringent, bitter and febrifuge[240]. An infusion of the bark has been used in the treatment of fevers, coughs and colds[257]. The root bark has been used as a wash for

old sores and ulcers[257]. The seed is nervine[240]. Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta S.E. Europe to W. Asia. Naturalized in Britain. ksacta Hedges in S. England[17].

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[113]. Soft-wood cuttings from strongly growing plants in spring to early summer in a frame. Layering in spring. Division of suckers during the dormant season. They can be planted out direct into their permanent positions.

nwatta Thrives in a well-drained moisture-retentive loamy soil[11, 200]. Prefers some lime in the soil but is likely to become chlorotic if too much lime is present[1]. Prefers an acid soil according to another report[5]. Succeeds in sun or partial shade though it fruits better in a sunny position[11, 200]. Plants are succeeding in a fairly exposed maritime position at Rosewarne in N. Cornwall[K]. Plants are hardy to about -20°C[184]. Long cultivated for its edible fruit, there are many named varieties[1, 50]. See separate entries for the various sub-species[K]. It is also a parent, with *P. avium*, of many cultivars of sweet cherries[1, 17]. Many cultivars will succeed on a north or east facing wall[219]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. Plants produce suckers freely[184]. Plants in this genus are notably susceptible to honey fungus[200]. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A sprouting standard sending up shoots from the base [1-2].

4.2.192 Hydrangea paniculata

Panicked hydrangea, Hybrid Hydrangea, PeeGee Hydrangea, Panicule Hydrangea

3 tlin 8 cyuc 1 kcaak 0 tcan 2 dwat 4 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli frusflatprikliwv hpa7tmwatli xre7t hjonli

drutta Hydrangea paniculata is a deciduous Shrub growing to 4 m (13ft) by 4 m (13ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from July to August, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: Edible Uses: RutinThe flowers contain up to 4.06% rutin[240].

tcanta Nails Paper WoodThe bark is used to make Japanese paper[46, 61, 74]. Wood - hard, white, fine grained. Used for small items, nails, walking sticks etc[46, 61, 74].

dwatta Blood tonicThe flowers contain up to 4.06% rutin[240]. This makes them useful for reducing the incidence of recurrent haemorrhages associated with increased

capillary fragility, particularly in hypertension[240]. The flowers also contain 2.5% of a phenolic compound[240].

nrakta E. Asia - China, Japan. ksacta Bamboo scrub, open forests and by streams[184]. Sparse forests or thickets in valleys or on mountain slopes or tops, at elevations of 300 - 2100 metres in China[266].

propta Seed - surface sow in a greenhouse in spring[113]. Cover the pot with paper until the seed germinates[78]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 8cm long, July/August in a frame. Overwinter in a greenhouse and plant out in late spring[78]. Cuttings of mature wood in late autumn in a frame[200]. Mound layering in spring. Takes 12 months[78]. Leaf-bud cuttings of the current seasons growth in a frame[200].

nwatta Landscape Uses: Border, Massing, Specimen, Woodland garden. Tolerates most soil[200], thriving in a well-drained loamy soil[1], but resenting dryness at the roots[11, 200]. Tolerates boggy soils[74]. Dislikes very alkaline soils[202]. Does well on very acid soils with a pH around 4.5[200]. The colour of the flowers reflects the pH of the soil the plant is growing in, the flowers are pink in a neutral to alkaline soil and blue in an acid soil. Succeeds in full sun or semi-shade[200], but if it is grown in a low rainfall area then it requires shade at the hottest part of the day[11]. Plants are hardy to about -25°C[184] when dormant but the young growth in spring can be killed by late frosts. A fast-growing plant[202]. A number of cultivars have been selected for their ornamental value[182]. Plants are very tolerant of pruning and can be cut back into old wood if required[188]. This species is notably susceptible to honey fungus[200]. Special Features: Not North American native, Suitable for cut flowers, Suitable for dried flowers, Blooms are very showy.

4.2.193 Lonicera chrysantha

Honeysuckle

3 tlin 7 cyuc 1 kcaak 0 tcan 0 dwat 4 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwv hpa7tmwatli xre7t hjonli

drutta Lonicera chrysantha is a deciduous Shrub growing to 4 m (13ft 1in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw[105, 177]. The fruit is about 7mm in diameter[200].

nrakta E. Asia - Japan. ksacta In deciduous coastal and montane forests and meadows[275].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed requires 2 months cold stratification[113] and should be sown as soon as possible in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm with or without a heel, July/August in a frame. Good percentage[78]. Cuttings of mature wood of the current season's growth, 15 - 20cm with or without a heel, November in a cold frame. Good percentage[78]. Layering in autumn[200].

nwatta An easily grown plant, succeeding in any fertile soil, and preferring a good moist soil in a sunny position[200]. It does not fruit so well when grown in the shade[200]. A very hardy plant, tolerating temperatures down to about -40°C[200]. Flowers and fruits are freely produced in Britain[184]. Closely related to *L. demissa*[182]. Some named forms have been developed for their ornamental value[182].

grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The whole plant is highly toxic - simple skin contact has caused numbness in some people[1, 200].

kcakta There is a report that this root has been boiled and used for food in Lapland[2]. However, this is a very poisonous plant and such a use is very inadvisable[K].

dwatta Alterative Anaesthetic Antiarthritic Antitussive Deobstruent Diaphoretic Diuretic Sedative StimulantThe root is alterative, anaesthetic, antiarthritic, antitussive, deobstruent, diaphoretic, diuretic, sedative and stimulant[178]. This is a very poisonous plant and should only be used with extreme caution and under the supervision of a qualified practitioner.

nrakta Europe to W. Asia. ksacta Not known
propta Seed - best sown as soon as it is ripe in a cold frame[111]. The seed can be stratified and sown in spring but will then be slow to germinate[133]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer. Division - best done in spring but it can also be done in autumn[1, 111]. Another report says that division is best carried out in the autumn or later because the plants come into growth very early in the year[233].

nwatta Thrives in most soils and in the light shade of trees[1]. Grows well in heavy clay soils. Prefers a moist soil in sun or semi-shade[200]. Prefers a calcareous soil. Grows well in open woodlands[1, 4]. If the flower stems are removed after flowering the plant will normally flower again later in the season[200]. Members of this genus seem to be immune to the predations of rabbits and deer[233]. A greedy plant, inhibiting the growth of nearby species, especially legumes[54]. A polymorphic species[1]. The nomenclature is very confused for this species, *A. lycoctonum*. *L.* is treated as *A. septentrionale* by many botanists whilst *A. lycoctonum*. Auct. is *A. vulparia*[50].

4.2.217 Aconitum lycoctonum vulparia

Wolfbane

3 tlin 7 cyuc 1 kcaak 0 tcan 1 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikliwv hpa7tmwatli xre7t hjonli

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

pcista The whole plant is highly toxic - simple skin contact has caused numbness in some people[1, 13, 65].

kcakta Some reports suggest the root is edible if cooked[2, 105], but these should be treated with extreme caution due to the highly toxic nature of the plant[K].

dwatta Analgesic Anodyne Diaphoretic Irritant SedativeThe root is analgesic, anodyne, diaphoretic, diuretic, irritant, sedative[4, 7, 9, 165]. This is a very poisonous plant and should only be used with extreme caution and under the supervision of a qualified practitioner.

nrakta Europe to Asia ksacta Woods and bushy places in damp shady places.

propta Seed - best sown as soon as it is ripe in a cold frame[111]. The seed can be stratified and sown in spring but will then be slow to germinate[133]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer. Division - best done in spring but it can also be done in autumn[1, 111]. Another report says that division is best carried out in the autumn or later because the plants come into growth very early in the year[233].

nwatta Thrives in most soils and in the light shade of trees[1]. Grows well in heavy clay soils. Prefers a moist soil

in sun or semi-shade[200]. Prefers a calcareous soil. Grows well in open woodlands[1, 4]. Members of this genus seem to be immune to the predations of rabbits and deer[233]. A greedy plant, inhibiting the growth of nearby species, especially legumes[54]. An aggregate species which is divided by some botanists into many species.

4.2.218 Clematis recta

Ground virginsbower

3 tlin 7 cyuc 1 kcaak 0 tcan 1 dwat 1.5 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwv hpa7tmwatli xre7t hjonli

drutta Clematis recta is a PERENNIAL CLIMBER growing to 1.5 m (5ft) by 0.6 m (2ft 3in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista Although no reports of toxicity have been seen for this species, some if not all members of this genus are mildly poisonous. The toxic principle is dissipated by heat or by drying[65].

kcakta Edible Parts: LeavesEdible Uses: Young shoot tips - cooked or pickled[177]. Some caution is advised, see the notes above on toxicity.

dwatta Antirheumatic Diaphoretic Diuretic Homeopathy RubefacientThe flowers and leaves are diaphoretic, diuretic and rubefacient[4]. They are taken both internally and externally in the treatment of syphilitic, cancerous and other foul ulcers[4]. Caution is advised since this is a poisonous plant[4]. A homeopathic remedy is made from the plant. It is used in the treatment of rheumatism and skin eruptions[238].

nrakta S. and E. Europe. ksacta Scrub, forest, river valleys and sunny hills[74, 187].

propta Seed - best sown as soon as it is ripe in a cold frame[164, 200]. Sow stored seed as soon as it is obtained in a cold frame. Pre-soak the seed for 12 hours in warm water and remove as much of the tail and outer coat as possible[164]. A period of cold stratification is beneficial[164]. The seed germinates in 1 - 9 months or more at 20°C[164]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant out in late spring or early summer, after the last expected frosts. Internodal cuttings of soft to semi-ripe wood, late spring in sandy soil in a frame[200]. Layering of old stems in late winter or early spring[200]. Layering of current seasons growth in early summer[200].

nwatta Succeeds in any soil in full sun[187, 200], but prefers a fertile sandy loam[200]. Dislikes poorly-drained heavy clay soils, but grows well in clay if grit is added for drainage[11, 200]. Does well on chalk. Dislikes winter wet[200]. Succeeds in acid as well as alkaline soils[200]. Plans are hardy to about -25°C[187]. A twining plant[182]. The leafstalks wrap themselves around twigs and branches for support. When a side of the stalk touches an object, the growth on that side slows down whilst the other side grows at its normal rate - this causes the leaf stalk to entwine the object it is touching[212]. There are some named forms, selected for their ornamental value[233]. When planting out, in order to avoid the disease 'clematis wilt', it is best to plant the rootball about 8cm deeper in the soil. This will also serve to build up a good root crown of growth buds[200]. Plants seem to be immune to the predations of rabbits[233]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

4.2.219 Lysimachia clethroides

Gooseneck Loosestrife, Gooseneck yellow loosestrife, Japanese Loosestrife, Shepherd's Crook

3 tlin 8 cyuc 1 kcaak 0 tcan 0 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikliwv hpa7tmwatli fyfxre7t hjonli

drutta Lysimachia clethroides is a PERENNIAL growing to 1 m (3ft 3in) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from July to September. The species is hermaphrodite (has

summer or the following spring. Basal cuttings in early summer. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Succeeds in any moderately fertile well-drained but moisture retentive soil in a sunny position[1, 200]. Plants are hardy to about -20°C[187].

4.2.213 *Solidago graminifolia*

Flat-Topped Goldenrod

3 tlin 7 cyuc 1 kcaak 0 tcan 1 dwat 1.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrp hpa7tli flatprklwis hpa7tmwatli xre7t hjonli

drutta *Solidago graminifolia* is a PERENNIAL growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcaakta Edible Parts: Edible Uses: TeaThe fresh or dried leaves are a tea substitute[183].

tcanta Mustard, orange and brown dyes can be obtained from the whole plant[168].

dwatta Antiseptic Febrifuge PectoralAntiseptic. An infusion of the dried powdered herb can be used[168]. A decoction of the root has been used in the treatment of chest pains and lung problems[257]. An infusion of the blossoms has been used in the treatment of some types of fevers[257].

nrakta N. America - British Columbia to Alberta, south to Florida and New Mexico. ksacta Damp to dryish shores, thickets and meadows[204].

propta Seed - sow spring in a cold frame. Only just cover the seed and do not allow the compost to become dry. Prick out the seedlings into individual pots when they are large enough to handle, and grow them on for their first winter in pots. Plant them out into their permanent positions in spring or early summer. Division in spring or autumn. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Succeeds in any moderately fertile moisture retentive soil in sun or semi-shade[200]. Grows well in heavy clay soils. A rather greedy plant, it is apt to impoverish the soil[1]. This plant has become a weed in its natural range and can be invasive under cultivation[200]. The plant attracts various beneficial insects such as ladybirds, lacewings and hoverflies to the garden, these insects will help to control insect pests in the garden[201, 238].

4.2.214 *Lonicera canadensis*

Fly Honeysuckle, American fly honeysuckle

3 tlin 7 cyuc 1 kcaak 0 tcan 1 dwat 1.5 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprklwis hpa7tmwatli xre7t hjonli

drutta *Lonicera canadensis* is a deciduous Shrub growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcaakta Edible Parts: FruitEdible Uses: Fruit[2, 177]. It is possibly edible[105]. The fruit is about 6mm in diameter[235].

dwatta Diuretic Sedative VDThe steeped branches are a very effective diuretic[207]. A decoction of the shoots is used in the treatment of chancres caused by syphilis[257]. The bark is sedative. An infusion has been given to children who cry all night[257].

nrakta N. America - Nova Scotia to Saskatchewan, Connecticut, Pennsylvania, Michigan and Minnesota. ksacta Cool moist woods[43, 235].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed requires 2 months cold stratification[113] and should be sown as soon as possible in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm with or without a heel, July/August in a frame. Good percentage[78]. Cuttings of mature wood of the current season's growth, 15 - 20cm with or without a heel, November in a cold frame. Good percentage[78]. Layering in autumn[200].

nwatta Grows best in a good moist soil in a sunny position, it does not fruit so well in the shade[200].

4.2.215 *Galium mollugo*

Hedge Bedstraw, False baby's breath

3 tlin 7 cyuc 1 kcaak 0 tcan 2 dwat m hkuc hmim cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatprklwis hpa7tmwatli fyfxre7t hjonli

drutta *Galium mollugo* is a PERENNIAL growing to 1.2 m (4ft) by 0.6 m (2ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from June to September, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies, beetles. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers dry or moist soil.

kcaakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked[62].

tcanta DyeA red dye is obtained from the root[100, 168]. It is very fiddly to utilize[169]. A good ground cover for growing in cool shade under shrubs or in the woodland garden[200].

dwatta Antispasmodic Epilepsy Lithontripic VulneraryThe plant is lithontripic and vulnerary. It is also used in the treatment of epilepsy and hysteria[4]. Both Asperuloside (a terpenoid) and Coumarin (a benzopyrone) occur in some species of *Galium*. Asperuloside can be converted into prostaglandins (hormone-like compounds that stimulate the uterus and affect blood vessels), making the genus of great interest to the pharmaceutical industry[238].

nrakta Most of Europe, including Britain, to N. Africa and temperate Asia. ksacta Hedgebanks, open woodland, scrub and grassy slopes, especially on base-rich and calcareous soils[17].

propta Seed - best sown in situ as soon as it is ripe in late summer[200]. The seed can also be sown in spring though it may be very slow to germinate[200]. This plant does not really need any help to reproduce itself. Division in spring or throughout the growing season if the plants are kept well watered[200]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Prefers a loose moist leafy soil in some shade[200]. Tolerates dry soils but the leaves quickly become scorched when growing in full sun[200]. This species does not thrive in a hot climate[200]. A polymorphic species[17].

4.2.216 *Aconitum lycoctonum*

Wolfsbane

3 tlin 7 cyuc 1 kcaak 0 tcan 1 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrp hpa7tli flatprklwis hpa7tmwatli hjonli

drutta *Aconitum lycoctonum* is a PERENNIAL growing to 1 m (3ft 3in) by 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from July to August. The flowers are pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can

4.2.194 *Symphoricarpos albus laevigatus*

Snowberry

3 tlin 7 cyuc 1 kcaak 0 tcan 2 dwat 3 m hkuc pcmhminhtut cyutli kyuctcup hwicli hrasjlutnyikfrp hpa7tli flatprklwis hpa7tmwatli xre7t hjonli

drutta *Symphoricarpos albus laevigatus* is a deciduous Shrub growing to 3 m (9ft) by 2 m (6ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to September, and the seeds ripen from September to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate maritime exposure. It can tolerate atmospheric pollution.

pcista The fruit contains saponins. Although toxic, these substances are very poorly absorbed by the body and so tend to pass through without causing harm. They are also broken down by thorough cooking. Saponins are found in many plants, including several that are often used for food, such as certain beans. It is advisable not to eat large quantities of food that contain saponins but it would take extremely large doses of many kilos of fruit from this plant in order to produce toxic symptoms[65]. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K].

kcaakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 105, 161]. An insipid flavour, it is best if cooked[177]. The fruit is rather boring[K]. The fruit is about 15mm in diameter[200]. See the notes at top of page regarding possible toxicity.

tcanta Broom Cosmetic Disinfectant Hair Hedge Hedge Soap Soil stabilizationPlants have extensive root systems and are used to stabilize soils on banks and slopes[200]. The branches can be tied together and used as a broom[99, 257]. The berries contain saponins and have been used as a hair wash[257]. A mild decoction of the wood has been used as a cleansing wash for babies[257]. The crushed berries have been rubbed into the armpits as an antiperspirant[257]. Very tolerant of trimming, it can be grown as a medium to tall hedge[29]. Its main drawback as a hedge is its propensity to sucker[K].

dwatta Disinfectant Diuretic Febrifuge Laxative Ophthalmic Poultice Salve Skin Stomachic TB VD WartsSnowberry was commonly employed medicinally by several native North American Indian tribes who valued it especially for the saponins it contains. These saponins can be toxic, but when applied externally they have a gentle cleansing and healing effect upon the skin, killing body parasites and helping in the healing of wounds. The native Americans used it to treat a variety of complaints but especially as an external wash on the skin[257]. The plant is little, if at all, used in modern herbalism. Any internal use of this plant should be carried out with care, and preferably under the supervision of a qualified practitioner. See the notes above on toxicity. The whole plant is disinfectant, diuretic, febrifuge and laxative[257]. An infusion of the stems has been drunk to treat stomach problems and menstrual disorders[213]. A decoction of the leaves has been used in the treatment of colds[257]. A poultice of the chewed leaves has been applied, or an infusion of the leaves has been used as a wash, in the treatment of external injuries[257]. A weak solution of the stems and leaves has been used as a wash for children whilst a stronger solution is applied to sores[213]. The fruit has been eaten, or used as an infusion, in the treatment of diarrhoea[257]. An infusion of the fruit has been used as an eye wash for sore eyes[257].The berries have been rubbed on the skin as a treatment for burns, rashes, itches and sores[257]. The berries have also been rubbed on warts in order to get rid of them - this treatment needs to be carried out at least three times a day for a period of a few weeks[257]. A poultice of the crushed leaves, fruit and bark has been used in the treatment of burns, sores, cuts, chapped and injured skin[257]. An infusion of the roots has been used in the treatment of fevers

(including childhood fevers), stomach aches and colds[257]. A decoction of the root bark has been used in the treatment of venereal disease and to restore the flow of urine[257]. An infusion of the root has been used as an eyewash for sore eyes[257]. An infusion of the whole plant has been drunk and also applied externally in the treatment of skin rashes[257]. A decoction of the roots and stems has been used in the treatment of the inability to urinate, venereal disease, tuberculousis and the fevers associated with teething sickness[257].

nrakta Western N. America. Naturalized in Britain[17]. ksacta Banks and flats in canyons and near streams below 1200 metres in California[71].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed requires 3 months warm then 5 months cold stratification[98]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame[113]. Cuttings of mature wood, 15 - 25cm long preferably with a heel, in a sheltered bed outdoors in winter. High percentage[78, 200]. Division of suckers in winter. They can be planted straight Tu into their permanent positions.

nwatta Tolerates most soils and conditions, including poor soils and amongst the roots and under the drip of trees[11, 200]. Grows well in heavy clay soils. Prefers a well-drained soil[200]. Does well in sun or shade[1]. Tolerates urban pollution and maritime exposure[200]. A very hardy plant, tolerating temperatures down to about -40°C[200]. A very ornamental but invasive plant, spreading by means of suckers[1, 11]. Its flowers are much visited by bees and the fruit is very attractive to wild life[1, 94]. There are some named varieties, developed for their ornamental value[11]. 'Constance Spry' bears a copious crop of large round berries. Plants in this genus are notably resistant to honey fungus[200].

4.2.195 *Euonymus alatus apterus*

Winged Spindle Tree

3 tlin 7 cyuc 1 kcaak 0 tcan 2 dwat 2 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatprklwis hpa7tmwatli xre7t hjonli

drutta *Euonymus alatus apterus* is a deciduous Shrub growing to 2 m (6ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to August, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Although no records of toxicity have been seen for this species, a number of plants in this genus are suspected of being poisonous and so some caution is advised.

kcaakta Edible Parts: Fruit LeavesEdible Uses: TeaYoung leaves, boiled[105, 177]. The fruit may be edible[105, 177]. No further details. The fruit is about 8mm in diameter[200]. These reports of edibility should be treated with some caution, see the notes above on toxicity. The flowers are a tea substitute[178].

dwatta Anodyne Anthelmintic Antiphlogistic Astringent Blood tonic Carminative EmmenagogueAnodyne, anthelmintic, antiphlogistic, astringent[178]. The stem and branches are alterative, analgesic, anthelmintic, anticoagulant, antipruritic, blood tonic, carminative, emmenagogue and purgative[147, 218]. A decoction is used in the treatment of 'cold' headache, general body aches, pruritis, irregular menstruation and other gynaecological diseases[147]. Plants contain the anticancer compound duciltoil[218].

nrakta E. Asia - Japan. ksacta Thickets and woods in lowland and mountains all over Japan.

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed requires 8 - 12 weeks warm followed by 8 - 16 weeks cold stratification and can then be sown in a cold frame[78, 98]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out

into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5 - 8cm long taken at a node or with a heel, July/August in a frame. Very easy[200].

nwatta Thrives in almost any well-drained soil, including chalk, it is particularly suited to dry shaded areas[200]. Prefers a well-drained loamy soil[1]. A very ornamental plant[1].

4.2.196 Ilex verticillata

Winterberry, Common winterberry
3 tin 7 cyuc 1 kcaak 0 tcan 3 dwat 2 m hkuc
hmmihtut cyutli tucphja7n hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli nyanhjen hjonli

drutta Ilex verticillata is a deciduous Shrub growing to 2 m (6ft) by 1.5 m (5ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from May to June, and the seeds ripen in October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

pcasta Although no specific reports of toxicity have been seen for this species, the fruits of at least some members of this genus contain saponins and are slightly toxic. They can cause vomiting, diarrhoea and stupor if eaten in quantity[274]. The fruit is poisonous[177].

kcakta Edible Parts: Edible Uses: TeaA tea is made from the dried and crumbled leaves[161, 177]. It does not contain caffeine[183].

dwatta Antiseptic Astringent Cathartic Malaria Skin TonicThe bark is antiseptic, astringent, cathartic and tonic[4, 238]. A decoction is used internally in the treatment of diarrhoea, malaria etc, and externally in the treatment of indolent sores and chronic skin disease[4, 238]. The bark contains about 4.8% tannin[4]. It is harvested in the autumn before the first frosts[4]. Another report says that the bark is harvested in the spring and dried for later use[238]. The fruit is cathartic[4].

nrakta Eastern N. America - Newfoundland to Minnesota and south to Georgia and Tennessee.. ksacta Swamps, pond margins and damp thickets[43].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. It can take 18 months to germinate. Stored seed generally requires two winters and a summer before it will germinate and should be sown as soon as possible in a cold frame. Scarification, followed by a warm stratification and then a cold stratification may speed up the germination time[78, 80]. The seedlings are rather slow-growing. Pot them up into individual pots when they are large enough to handle and grow them on in light shade in a cold frame for their first year. It is possible to plant them out into a nursery bed in late spring of the following year, but they should not be left here for more than two years since they do not like being transplanted. Alternatively, grow them on in their pots for a second season and then plant them out into their permanent positions in late spring or early summer. Give them a good mulch and some protection for their first winter outdoors. Cuttings of almost ripe wood with a heel, August in a shaded position in a cold frame. Leave for 12 months before potting up. Layering in October. Takes 2 years[78]. Division in the dormant season.

nwatta Succeeds in most soils so long as they are not water-logged[200]. This species tolerates wetter conditions than most members of the genus[238]. A very ornamental and cold-hardy plant, tolerating temperatures down to about -35°C[184]. A slow-growing tree in the wild[229]. A number of named forms have been selected for their ornamental value[182]. Flowers are produced on the current year's growth[229]. The plants are very tolerant of pruning and can be cut right back into old wood if required[188]. Unlike most members of the genus, this species produces suckers[200]. Resents root disturbance, especially as the plants get older[11]. It is best to place the plants into their permanent positions as soon as possible, perhaps giving some win-

ter protection for their first year or two[K]. Dioecious. Male and female plants must be grown if seed is required.

4.2.197 Eupatorium purpureum

Gravel Root
3 tin 9 cyuc 1 kcaak 2 tcan 3 dwat 2 m hkuc
hmmihtut cyutli tucp hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta Eupatorium purpureum is a PERENNIAL growing to 2 m (6ft) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from August to October, and the seeds ripen from September to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Edible Uses: SaltThe roots have been burnt and their ashes used as salt to flavour foods[257]. tcanta Dye StrawThe stems have been used as straws[257]. The fruits yield a pink or red textile dye[268].

dwatta Astringent Diuretic Nervine Tonic UrinaryGravel root was used by the native N. American Indians as a diaphoretic to induce perspiration and break a fever. The plant was quickly adopted by the white settlers and still finds a use in modern herbalism[268]. The whole plant, but especially the root, is astringent, diuretic, nervine and tonic[4, 21, 165]. It works particularly on the genito-urinary system and the uterus[238]. Especially valuable as a diuretic and stimulant, as well as an astringent tonic[4], a tea made from the roots and leaves has been used to eliminate stones from the urinary tract, to treat urinary incontinence in children, cystitis, urethritis, impotence etc[222, 254, 268]. It is also said to be helpful in treating rheumatism and gout by increasing the removal of waste from the kidneys[254, 257]. The leaves and flowering stems are harvested in the summer before the buds open and are dried for later use. The roots are harvested in the autumn and dried for later use[238].

nrakta Eastern N. America - New Hampshire to Minnesota, south to Florida and Oklahoma[187]. ksacta Swampy and rich low ground and in woods, especially on calcareous soils[4, 21, 43].

propta Seed - sow spring in a cold frame and only just cover the seed. Prick out the seedlings into individual pots when they are large enough to handle and plant them out into their permanent positions in the summer. Division in spring or autumn[111]. Very easy, the clumps can be replanted direct into their permanent positions.

nwatta Landscape Uses:Border, Massing, Specimen, Woodland garden. Succeeds in ordinary garden soil that is well-drained but moisture retentive in sun or part shade[200]. Plants can be grown in quite coarse grass, which can be cut annually in the autumn[233]. A very cold-hardy plant, tolerating temperatures down to about -25°C[187]. The bruised leaves have a vanilla-like odour[213]. Plants seem to be immune to the predations of rabbits[233]. Butterflies are attracted to this plant[187]. Special Features:North American native, Fragrant foliage, Naturalizing, Wetlands plant, Attracts butterflies, Suitable for cut flowers. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is clumping, giving the plant a clumping habit. The predictable growth behaviour makes it easier to maintain without having to apply containment methods[2-1].

4.2.198 Aster tataricus

Tartarian Aster
3 tin 7 cyuc 1 kcaak 0 tcan 3 dwat 2 m hkuc
htut cyutli tucp hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta Aster tataricus is a PERENNIAL growing to 2 m (6ft) by 1.2 m (4ft in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from September to October. The species is hermaphrodite (has both male and female

Foetid bugbane is an anti-infective herb that lowers fevers and reduces pain[238]. The root is analgesic, antibacterial, antiperiodic, antiviral, depurative, diaphoretic, diuretic, febrifuge, sedative, tonic[46, 61, 147, 176, 218, 240]. It is used internally in the treatment of rheumatic complaints, coughs, colds, headaches, gum diseases and feverish infections such as measles[238, 240]. The root is harvested in the autumn and used fresh or dried[238]. Use with caution[176], see the notes above on toxicity.

nrakta E. Asia - C. Russia to Japan. ksacta Shrubberies and forest clearings on open humus-rich soils, to 4000 metres in the Himalayas[51, 145]. Frequently found in fir forests in Kashmir[211].

propta Seed - best sown as soon as it is ripe in a cold frame[1]. Only just cover the seed. It germinates in 1 - 12 months or even longer at 15°C[164]. The seed does not store well and soon loses its viability[200], stored seed may germinate better if given 6 - 8 weeks warm stratification at 15°C and then 8 weeks cold stratification[164]. Prick out the young seedlings into individual pots when they are large enough to handle and grow them on in a frame for their first winter. Plant out in late spring or early summer[K]. Division in spring or autumn[1]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the summer or following spring.

nwatta Prefers a moist humus rich soil and some shade[1, 200]. Succeeds in ordinary garden soil[1]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54]. There is some confusion over the name of this species. C. foetida (Auct.) is given as a synonym for C. europaea Schpeiz (said to be native to E. Europe) whilst another authority cites C. europaea as a synonym of C. foetida. It is possible that entries under this species apply also (or instead) to C. europaea[50]. A very attractive plant, but the flowers and the green seed pods have an unusual, slightly unpleasant smell[188] that is reminiscent of decaying fish[245].

4.2.210 Artemisia sacrorum

Russian Wormwood
3 tin 7 cyuc 1 kcaak 0 tcan 0 dwat 1 m hkuc
htut cyutli hgatkuyctcup hwicli hyishrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

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

pcasta Although no reports of toxicity have been seen for this species, skin contact with some members of this genus can cause dermatitis or other allergic reactions in some people[222].

kcakta Edible Parts: LeavesEdible Uses: One report says that the plant is edible but gives no more details[177].

nrakta E. Asia - from Afghanistan to India, Tibet, China and Mongolia. ksacta Widespread throughout China on hills, waysides, shrublands, slopes (where it is often dominant on southern slopes), roadsides and forest steppe from low to middle elevations[266].

propta Seed - surface sow from late winter to early summer in a greenhouse, making sure that the compost does not dry out[200]. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant out in late spring or early summer. Division in spring or autumn[200]. Basal cuttings in late spring. Harvest the young shoots when about 10 - 15cm long, pot up in a lightly shaded position in a greenhouse or cold frame and plant them out when well rooted. Very easy.

nwatta Easily grown in a well-drained circumneutral or slightly alkaline loamy soil, preferring a warm sunny dry position[1, 200]. Established plants are drought tolerant[200]. Plants are longer lived, more hardy and more aromatic when they are grown in a poor dry soil[245]. This species is closely

related to Artemisia gmelinii and is often confused with that species[266]. We are not sure if this plant is annual, biennial or perennial, since various reports differ. Members of this genus are rarely if ever troubled by browsing deer[233].

4.2.211 Erigeron annuus

Annual Fleabane, Eastern daisy fleabane
3 tin 8 cyuc 1 kcaak 0 tcan 0 dwat 1 m hkuc
htut cyutli tucp hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta Erigeron annuus is a ANNUAL/PERENNIAL growing to 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. The species is hermaphrodite (has both male and female organs) and is pollinated by Lepidoptera (Moths and Butterflies), bees, Apomictic (reproduce by seeds formed without sexual fusion). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young plant - boiled[105, 177].

nrakta N. America. Naturalized in C. Europe. ksacta Fields and waste places[43]. Prairies and open ground in various soil types in Texas[274].

propta Seed - sow spring in situ. The seed usually germinates within four weeks.

nwatta Landscape Uses:Border, Container, Rock garden, Seashore, Specimen. Prefers a moderately fertile well-drained soil in a sunny position[200]. A polymorphic species[50]. A self-fertile plant, producing seed apomictically[50]. Very few members of this genus will hybridise with other members of the genus[274]. Special Features:North American native, Naturalizing, Attracts butterflies, Suitable for cut flowers.

4.2.212 Verbena hastata

American Blue Vervain, Swamp verbena
3 tin 7 cyuc 1 kcaak 0 tcan 2 dwat 1.5 m hkuc
htut cyutli tucp hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta Verbena hastata is a PERENNIAL growing to 1.5 m (5ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: SeedEdible Uses: TeaSeed - cooked[257]. The seed can be roasted and ground into a powder or used whole as a piñole[105, 161, 183, 257]. Pleasantly bitter, some of this bitterness can be removed by leeching the flour[183]. The leaves are used as a tea substitute[161, 183, 257].

dwatta Antiperiodic Diaphoretic Emetic Expectarant Tonic Vermifuge VulneraryThe leaves and roots are antiperiodic, diaphoretic, emetic, expectarant, tonic, vermifuge and vulnerary[4, 21, 46, 222]. The roots are more active than the leaves[222]. The plant is used in the treatment of stomach aches, gravel, worms and scrofula[4, 257]. An infusion of the roots, leaves or seeds has been used in the early stages of fevers[257]. A snuff made from the dried flowers has been used to treat nose bleeds[257].

nrakta N. America - Nova Scotia and New Brunswick to Florida, and from California to British Columbia. ksacta Swales, damp thickets and shores[43].

propta Seed - sow early spring in a greenhouse or cold frame and only just cover the seed[1]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the

Any preparation made from the leaves needs to be carefully strained in order to remove the small hairs which can be an irritant[7]. The plant is harvested when in flower and is dried for later use[238]. An infusion of the flowers in olive oil is used as earache drops, or as a local application in the treatment of piles and other mucous membrane inflammations[4, 222, 238]. This infusion is also strongly bactericidal[4]. A decoction of the roots is said to alleviate toothache and also relieve cramps and convulsions[4]. The juice of the plant and powder made from the dried roots is said to quickly remove rough warts when rubbed on them[4]. It is not thought to be so useful for smooth warts[4]. The seeds are slightly narcotic and also contain saponins[4]. A poultice made from the seeds and leaves is used to draw out splinters[4]. A decoction of the seeds is used to soothe chilblains and chapped skin[7]. A homeopathic remedy is made from the fresh leaves[4]. It is used in the treatment of long-standing headaches accompanied with oppression of the ear[4].

nrakta Europe, including Britain, from Norway south and east to Spain, temperate Asia to China. ksacta Sunny positions in uncultivated fields and waste ground, especially on dry soils[7, 13, 17].

propta Seed - sow late spring to early summer in a cold frame and only just cover the seed[200]. Germination usually takes place within 2 - 3 weeks. When they are large enough to handle, prick out the seedlings into individual pots and plant them out in late summer. The seed has a long viability[200].

nwatta An easily grown plant, it succeeds in most well-drained soils, including dry ones, and prefers a sunny position[200]. Dislikes shade and wet soils[200]. Thrives on chalk[200]. Prefers a light soil[200]. Hybridizes with other members of this genus, though the progeny are usually sterile[200]. A very ornamental plant, it often self-sows, especially on dry calcareous soils[53, 124]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fibrous dividing into a large number of fine roots [2-1]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fleshy. Thick or swollen - fibrous or tap root [2-1].

4.2.207 Berula erecta

Cutleaf Waterparsnip

3 tlin 7 cyuc 1 kcaak 0 tcan 1 dwat 1 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flat-prikliwis hpa7tmwatli xre7t hjonli

drutta Berula erecta is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

pcista The plant is toxic, and capable of causing death to grazing animals[274].

kcakta The leaves and flowers have been used for food[257].

dwatta The plant is used externally in the treatment of rheumatism[257]. An infusion of the whole plant can be used as a wash for swellings, rashes and athletes foot infections[257].

nrakta Most of Europe, including Britain, N. America, W. and C. Asia. ksacta Ditches, canals, ponds, fens and marshes throughout Britain[17].

propta Seed -

nwatta We have no information on the cultivation needs of this plant but, judging by its native habitats, it is likely to need a moist to wet soil in full sun or light shade[K]. The leaves of this plant are very similar to Apium nodiflorum, differing in colour and in the usually greater number of pairs of segments[17].

4.2.208 Artemisia gmelinii

Russian Wormwood, Gmelin's wormwood

3 tlin 7 cyuc 1 kcaak 0 tcan 1 dwat 1.5 m hkuc htut cyutli hgatyuctcup hwicli hyishrasjlutnyik hpa7tli flat-prikliwis hpa7tmwatli xre7t hjonli

drutta Artemisia gmelinii is a PERENNIAL growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from August to October, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by In-sects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista Although no reports of toxicity have been seen for this species, skin contact with some members of this genus can cause dermatitis or other allergic reactions in some people[222].

kcakta Edible Parts: LeavesEdible Uses: One report says that the plant is edible but gives no more details[177].

tcanta The plant yields 1% essential oil, which contains 19% essential oil, 6% camphor[240].

dwatta HepaticThe leaf and stem are used in Korea to treat hepatitis, hyperlipaemia and infected cholecystitis[279]. The plant contains flavonoids, sesquiterpenes and other bio-active constituents, though no bio-activites have been recorded scientifically[279].

nrakta Eastern Europe to Central Asia, China, Mongolia and Korea. ksacta Dry stony slopes, especially in Ladakh and Lahul, 2100 - 4200 metres[51]. Hills, steppe, semidesert steppe, meadows, rocky slopes, scrub, dry floodlands, wastelands; 1500-4900 m[266].

propta Seed - surface sow from late winter to early summer in a greenhouse, making sure that the compost does not dry out[200]. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant out in late spring or early summer. Division in spring or autumn[200]. Basal cuttings in late spring. Harvest the young shoots when about10 - 15cm long, pot up in a lightly shaded position in a greenhouse or cold frame and plant them out when well rooted. Very easy.

nwatta Easily grown in a well-drained circumneutral or slightly alkaline loamy soil, preferring a warm sunny dry position[1, 200]. Established plants are drought tolerant[200]. Plants are longer lived, more hardy and more aromatic when they are grown in a poor dry soil[245]. This species is closely related to A. sacrorum and often confused with that species[266]. We are not sure if this plant is annual, biennial or perennial, since various reports differ. Members of this genus are rarely if ever troubled by browsing deer[233].

4.2.209 Cimicifuga foetida

Foetid Bugbane

3 tlin 7 cyuc 1 kcaak 0 tcan 3 dwat 1.5 m hkuc hmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Cimicifuga foetida is a PERENNIAL growing to 1.5 m (5ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

pcista Although no specific mention of toxicity has been seen for this species, it does belong to a family that contains a number of toxic species and at least one species in this genus is said to be mildly poisonous. Some caution is therefore advised.

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

tcanta RepellentBoth the growing and the dried plant is used as an insect repellent in Siberia[1, 211, 240].

dwatta Analgesic Antibacterial Antiperiodic Antiviral Depurative Diaphoretic Diuretic Febrifuge Sedative Tonic-

organs) and is pollinated by Bees, flies, beetles, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young plant[105, 177]. No more details are given.

dwatta Antibacterial Antifungal Antitussive Cancer Expecto-rantThis species has been used for at least 2,000 years in traditional Chinese medicine. The root contains triterpenes and triterpene saponins, and is a stimulant expecto-rant herb for the bronchial system, helping to clear infections[238, 279]. It is antibacterial, antifungal, antitussive, expecto-rant and stimulant[176, 218, 238, 279]. It has an antibacterial action, inhibiting the growth of Staphylococcus aureus, E. coli, Bacillus dysenteriae, B. typhi, Pseudomonas and Vibrio Proteus[176]. The root is taken internally in the treatment of chronic bronchitis and tuberculosis and is often used raw with honey in order to increase the expecto-rant effect[176, 238]. The root is harvested in the autumn and can be dried for later use[238]. The plant contains the triterpene epifriedelinol, which has shown anticancer activity, and is used as a folk cure for cancer[218, 279].

nrakta E. Asia - China, Japan, Korea, Siberia. ksacta Subalpine meadows and wet places, C. and S. Japan[58, 187]. Marshy areas in mountains[279].

propta Seed - surface sow in spring in a cold frame. Do not allow the compost to become dry. Pre-chilling the seed for two weeks can improve germination rates[134]. Germination usually takes place within 2 weeks at 20°c[134]. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Basal cuttings in the spring. Harvest the shoots when they are about 10 - 15cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer. Division in spring or autumn[200]. Very easy, larger divisions can be planted straight into their permanent positions whilst smaller clumps are best potted up and kept in a cold frame until they are growing away well.

nwatta Succeeds in most good garden soils[1], preferring one that is well-drained and moisture retentive[200]. Prefers a sunny position[200], but also succeeds in partial shade[238]. Plants are hardy to at least -15°c[238]. Plants can suffer from mildew when growing in dry conditions[238]. This species is cultivated in China as a medicinal herb[238]. Most species in this genus seem to be immune to the predations of rabbits[233]. Hybridizes freely with other members of this genus[200].

4.2.199 Rudbeckia laciniata

Cone Flower, Cutleaf coneflower, Green Headed Coneflower
3 tlin 7 cyuc 1 kcaak 0 tcan 1 dwat 2.4 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Rudbeckia laciniata is a PERENNIAL growing to 2.4 m (7ft) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to October, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, hoverflies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

pcista This plant is reputed to be poisonous to cattle, sheep and pigs[155].

kcakta Edible Parts: StemEdible Uses: Edible young stems[105, 155, 161]. Cooked and eaten in the spring for 'good health'[222, 257]. The young stems can be eaten like celery[257]. The stems can also be dried for later use[257]. Some caution is advised, see the notes above on toxicity.

tcanta DyeA green dye is obtained from the flowers[168].

dwatta Carminative PoulticeA tea made from the root (mixed with Caulophyllum thalictroides) is used in the treatment of indigestion[222, 257]. A poultice of the flowers

(mixed with Agastache anisatum and Solidago sp.) is applied to burns[222, 257].

nrakta N. America - Quebec to Manitoba, Colorado Florida. Locally naturalized garden escape in Britain[17]. ks-acta Stream banks and moist places in rich low ground[43, 60].

propta Seed - sow April in a greenhouse. Only just cover the seed. Germination should take place within 2 weeks, prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer[K]. The seed can also be sown in situ[111]. Division in spring or autumn[111]. Very easy, larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Landscape Uses:Container, Massing. Succeeds in an ordinary medium soil in sun or shade[111]. Requires a moist soil[1]. Prefers a well-drained soil[188]. Tolerates considerable wind exposure without support[K]. Plants can be grown in quite coarse grass, which can be cut annually in the autumn[233]. They grow particularly well in long hot late summers[200]. Dormant plants are hardy to about - 25°c[187]. Some named forms have been selected for their ornamental value[187]. Members of this genus are rarely if ever troubled by browsing deer[233]. Plants can be invasive[200]. Special Features:Attracts birds, North American native, All or parts of this plant are poisonous, Attracts butterflies, Suitable for cut flowers.

4.2.200 Stephanandra incisa

Laceshrub, Cutleaf Stephanandra

3 tin 7 cyuc 1 kcaak 0 tcan 0 dwat 2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Stephanandra incisa is a deciduous Shrub growing to 2 m (6ft) by 3 m (9ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in June, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young leaves[105, 177]. No more details are given.

tcanta Hedge HedgeThe cultivars 'Crispa' (syn 'Prostrata') and 'Dart's Horizon' make dense arching ground cover plants[197, 200]. They should be spaced about 1.2 metres apart each way[208]. Plants are sometimes grown as an informal hedge.

nrakta E. Asia - China, Japan, Korea. ksacta Thickets in low mountains all over Japan[58]. On mountain slopes, or by streams at elevations of 500 - 1000 metres in southern China[266].

propta Seed - we have no information for this species but it is likely to require a period of cold stratification and would probably be best sown in a cold frame as soon as it is ripe. Sow stored seed in a cold frame as soon as it is received. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in early spring is a very effective means of increase[78]. Roots cuttings, March in a warm greenhouse[11]. Cuttings of half-ripe wood, 10 - 12cm long, July in a frame. High percentage[78].

nwatta Landscape Uses:Border, Cascades, Erosion control, Ground cover, Massing, Specimen. Thrives in a reasonably moist but well-drained soil in sun or part shade[1, 11, 182]. Hardy to at least -20°c[200]. There some named varieties[182]. Plants in this genus are notably resistant to honey fungus[200].

4.2.201 Veratrum viride

Indian Poke, American Hellebore

3 tin 7 cyuc 1 kcaak 0 tcan 2 dwat 2 m hkuc

hmmihtut cyutli tcuphja7n hwicli hrasljutnyik hpa7tli flatprikhwis hpa7tmwatli xre7t hjonli

drutta Veratrum viride is a PERENNIAL growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

pcista All parts of the plant are highly poisonous[1, 4, 19, 62, 65]. After the plant dies down in the autumn and has been frosted, the toxins decrease and the plant becomes harmless to animals[212].

kcakta One report says that the leaves have been used in soups[257]. The plant is highly toxic, so this use is probably best avoided[K].

tcanta Cleanser Fibre InsecticideThe dried and powdered root is used as an insecticide and a parasiticide[46, 61, 212]. It is also effective against caterpillars and mammals so great caution is advised[1, 19, 20]. The roots have been grated, then added to the laundry water and used to clean clothing[257]. A fibre obtained from the stem is used for weaving wallets etc[99].

dwatta Analgesic Diaphoretic Emetic Expectorant Febrifuge Hypotensive Narcotic SedativeIndian poke is a highly toxic plant that was widely employed medicinally by several native North American Indian tribes who used it mainly externally in the treatment of wounds, pain etc[257]. It is rarely used in modern herbalism, though it is of potential interest because it contains steroidal and other alkaloids and chelidonic acid. Some of these alkaloids lower blood pressure and dilate the peripheral vessels - they have, for example, been used in conventional medicine to treat high blood pressure and rapid heart beat[207, 212, 254]. Any use of this plant should be carried out with great caution and preferably only under the supervision of a qualified practitioner[21]. Even when applied externally to unbroken skin it has been known to cause side-effects[254]. See also the notes above on toxicity The root is analgesic, diaphoretic, emetic, expectorant, febrifuge, narcotic and sedative[4, 21, 257]. It has been used in the treatment of acute cases of pneumonia, peritonitis and threatened apoplexy[244]. A decoction of the root has been used in the treatment of chronic coughs and constipation[257]. A portion of the root has been chewed, or a decoction used, in the treatment of stomach pain[257]. The roots are harvested in the autumn and can be dried for later use[254]. The root has been used to make a skin wash and compresses for bruises, sprains and fractures[257]. The powdered root has been applied as a healing agent to wounds[207] and as a delousing agent[254]. The stems have been scraped and the powder snuffed to induce sneezing[257]. An infusion of the leaves has been used as a wash to treat aches and pains[257]. The plant is used in homeopathic preparations to slow the heart rate[254].

nrakta Eastern N. America - New England to Georgia and Wisconsin, western from Alaska to Oregon. ksacta Swamps, moist meadows and low ground[21].

propta Unless stored in damp sand at around 4°C the seed has a short viability[200]. Where possible it is best to sow the seed in a lightly shaded position in the greenhouse as soon as it is ripe[200]. Stored seed needs to be stratified but can be very slow to germinate. Germination can be erratic even for seed sown when it was fresh, it usually takes place within 3 - 12 months at 15°C but can be much longer[200]. The plant produces just one seedleaf in its first year, this forms an over-wintering bulb. It takes up to 10 years for the plant to reach maturity[200]. Sow the seed thinly so there is no need to thin or transplant them, and grow the seedlings on undisturbed in the pot for their first two years of growth. Apply a liquid feed at intervals through the growing season to ensure the plants do not become nutrient deficient. At the end of the second year plant out the dormant plants into individual pots and grow them on in light shade in the greenhouse for a further year or two before planting them out into their permanent positions in late spring or early summer. Division in March/April or in October. Establish the plants in pots in a shaded frame before planting them out[200]. Division is best carried out in the autumn because the plants come into growth very early in the spring[233]. Root cuttings, 6mm long with a bud, rooted in a sandy soil in a cold

frame[200].

nwatta Requires a deep fertile moisture retentive humus-rich soil[200]. Succeeds in full sun if the soil does not dry out but prefers a position in semi-shade[200]. Dislikes dry soils, preferring to grow in a bog garden[42]. Grows best in a cool woodland garden or a north facing border[42]. Members of this genus are rarely if ever troubled by browsing deer[233]. Plants are long-lived and can be left in the same position for years without attention[233]. In some N. American Indian tribes, following the death of a chief, all the young aspirants to be chief were given a drink of this toxic plant and the person least affected was deemed to be the strongest and therefore made chief[200].

4.2.202 Poa pratensis

Kentucky Blue Grass, Spreading bluegrass
3 tlin 9 cyuc 1 kcaak 0 tcan 0 dwat 1 m hkuc
htut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikhwis hpa7tmwatli xre7t hjonli

drutta Poa pratensis is a PERENNIAL growing to 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from May to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: SeedEdible Uses: One report suggests that it might be edible but gives no details[177]. It is quite probably referring to the seed (which is small and very fiddly too utilize) but might be referring to the base of the leaf stems, which is eaten in one other member of this genus.

nrakta Most of Europe, including Britain, to N. Africa, temperate Asia and N. America. ksacta Meadows and grassy places, it is also found on dunes[17]. Common and widespread in Britain, but it is only found on mountains in the south of its range[17].

propta Seed - surface sow in the spring in a cold frame. Do not allow the compost to dry out. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in the spring. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Landscape Uses:Erosion control, Ground cover. Succeeds in any well-drained moderately fertile soil in a sunny position[200]. A polymorphic species[17]. It can be grown in lawns[11]. Special Features:Attractive foliage, Not North American native, Inconspicuous flowers or blooms.

4.2.203 Monarda menthifolia

Mint-Leaved Bergamot, Mintleaf bergamot
3 tlin 7 cyuc 1 kcaak 0 tcan 2 dwat m hkuc
hmmihtut cyutli tcup hwicli hrasljutnyikfrip hpa7tli flatprikhwis hpa7tmwatli fyfjxre7t hjonli

drutta Monarda menthifolia is a PERENNIAL growing to 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: TeaLeaves - used as an aromatic tea[212]. The leaves are a very common and popular potherb with the Hopi Indians - they are gathered and dried in bundles for winter use[216].

dwatta Anaesthetic Antiseptic DiaphoreticThe leaves and flowering stems are anaesthetic, antiseptic and diaphoretic[238]. An infusion is used in the treatment of fevers and sore throats[257]. The pulverized plant has been rubbed

on the head to bring relief from a headache[257]. An infusion of the plant is used as a wash on wounds[257]. The plant is a source of the medicinal essential oil 'thymol', which is antiseptic[212].

nrakta N. America - Manitoba to Alberta, south to Arizona and Texas. ksacta Medium-dry to moist soils in valleys, prairies and mountains to 2,100 metres[212].

propta Seed - sow mid to late spring in a cold frame. Germination usually takes place within 10 - 40 days at 20°C. When large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in early summer. The seed can also be sown in situ in late summer in areas where the winters are not too severe and will produce larger plants. Cuttings of soft basal shoots in spring. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer. Division in spring or autumn. Large divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Easily grown in ordinary garden soil so long as it is not too dry[1, 200]. Requires a moist soil and a sunny position[200]. A good bee plant[200]. Subject to mildew in dry summers[200]. The Hopi Indians occasionally cultivate this plant as a pot herb[216].

4.2.204 Lonicera morrowii

Morrow's honeysuckle
3 tlin 7 cyuc 1 kcaak 0 tcan 1 dwat m hkuc
htut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikhwis hpa7tmwatli xre7t hjonli

drutta Lonicera morrowii is a deciduous Shrub growing to 2 m (6ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista The fruit is poisonous[275].
kcakta Edible Parts: FruitEdible Uses: Fruit - raw[105, 179]. There is a question mark as to whether this fruit might be poisonous, or perhaps cathartic and emetic[105, 179]. The fruit is about 7mm in diameter[200].

dwatta Cathartic EmeticThe fruit is cathartic and emetic[179].

nrakta E. Asia - Japan. ksacta Open places in meadows, river sides, sandy coasts, and open deciduous forests of lowlands and montane regions[275].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed requires 2 months cold stratification[113] and should be sown as soon as possible in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm with or without a heel, July/August in a frame. Good percentage[78]. Cuttings of mature wood of the current season's growth, 15 - 20cm with or without a heel, November in a cold frame. Good percentage[78]. Layering in autumn[200].

nwatta An easily grown plant, succeeding in any fertile soil, and preferring a good moist soil in a sunny position[11, 200]. There is at least one named variety, developed for its ornamental value. 'Guldperle' is from Denmark and has yellow berries[182].

4.2.205 Saussurea pulchella

3 tlin 7 cyuc 1 kcaak 0 tcan 0 dwat 1.5 m hkuc
hmmihtut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikhwis hpa7tmwatli xre7t hjonli

drutta Saussurea pulchella is a PERENNIAL growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to August. The species

is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young leaves - cooked[105, 177].

nrakta E. Asia - Japan, Korea. ksacta Grassy places in mountains all over Japan[58].

propta Seed - we have no information for this species but suggest sowing the seed in a cold frame in the spring. Surface sow, or only just cover the seed, and make sure that the compost does not dry out. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse or cold frame for their first winter. Plant them out in late spring after the last expected frosts. Division in spring might be possible.

nwatta Succeeds in moist soils in a sunny well-drained position[11].

4.2.206 Verbascum thapsus

Great Mullein, Common mullein, Aaron's Rod, Flannel Plant, Hag Taper, Mullein, Torches, Velvet Plant
3 tlin 8 cyuc 1 kcaak 4 tcan 3 dwat 1.8 m hkuc
htut cyutli kyucutcup hwicli hrasljutnyik hpa7tli flatprikhwisslip hpa7tmwatli fyfjxre7t hjonli

drutta Verbascum thapsus is a BIENNIAL growing to 1.8 m (6ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from June to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate strong winds but not maritime exposure.

pcista The leaves contain rotenone and coumarin, though the quantities are not given[222]. Rotenone is used as an insecticide and coumarin can prevent the blood from clotting[K]. Hairs on the leaves can act as an irritant[222].

kcakta Edible Parts: Edible Uses: TeaAn aromatic, slightly bitter tea can be made by infusing the dried leaves in boiling water for 5 - 10 minutes[183]. A sweeter tea can be made by infusing the fresh or dried flowers[183].

tcanta Dye Insecticide Insulation Lighting Tinder Wick-Landscape Uses: Border - a very ornamental plant. A yellow dye is obtained from the flowers by boiling them in water[4]. When used with dilute sulphuric acid they produce a rather permanent green dye, this becomes brown with the addition of alkalis[4, 13, 100, 168]. An infusion of the flowers is sometimes used to dye the hair a golden colour[4, 200]. The flowering stems can be dipped in wax and used as torches[53, 106, 124]. The down on the leaves and stems makes an excellent tinder when quite dry[4, 53, 115]. It is also used as an insulation in shoes to keep the feet warm[4, 200] and to make wicks for candle[1, 4, 13, 100, 115, 124]. One report says that the leaves contain rotenone, though it does not say in what quantity[222]. Rotenone is used as an insecticide[K]. Special Features:Attracts birds, Attractive foliage, Edible, Not North American native, Invasive, Naturalizing, Attracts butterflies, Suitable for dried flowers, Attractive flowers or blooms. Dynamic accumulator.

dwatta Anodyne Antiseptic Astringent Demulcent Emollient Expectorant Homeopathy Narcotic Odontalgic VulneraryGreat mullein is a commonly used domestic herbal remedy, valued for its efficacy in the treatment of pectoral complaints[4]. It acts by reducing the formation of mucus and stimulating the coughing up of phlegm, and is a specific treatment for tracheitis and bronchitis[254]. The leaves and the flowers are anodyne, anti-inflammatory, antiseptic, antispasmodic, astringent, demulcent, diuretic, emollient, expectorant and vulnerary[4, 7, 13, 21, 46, 53, 165, 222]. An infusion is taken internally in the treatment of a wide range of chest complaints and also to treat diarrhoea[4, 238]. The plant combines well with other expectorants such as coltsfoot (Tussilago farfara) and thyme (Thymus vulgaris)[254]. Externally, a poultice of the leaves is a good healer of wounds and is also applied to ulcers, tumours and piles[4, 222, 254].

from May to June, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

pcista All parts of the plant, and especially the seed, are poisonous[1, 61].

tcanta Insecticide Rootstock WoodThis plant is often used as a rootstock for other members of the pea and bean family[11]. The seeds contain the poisonous alkaloid 'cytisine'. This has insecticidal properties similar to nicotine (Nicotiana spp.) but cannot be recommended for use since it needs to be used in such a concentration that it can then be absorbed over a wide area of the body with possibly fatal results[4]. Wood - coarse grained, durable, dark coloured and very hard, it can be used as an ebony substitute[4, 11, 46]. It is much in demand among turners, and is used in making instruments and furniture especially where strength and smoothness are important[4, 11, 46, 61].

dwatta PectoralThe seed contains the poisonous alkaloid 'cystisine'. This has been used in the treatment of whooping cough and asthma[4].

nrakta C. and S. Europe. ksacta Woods and scrub on limestone[50, 200].

propta Seed - best sown as soon as it is ripe in a greenhouse or cold frame[200]. Germination is usually very quick and good[78]. Prick out indoor-sown seedlings into individual pots when they are large enough to handle and plant them out in the summer. Another option is to pre-soak the stored seed for 12 hours in warm water and sow in an outdoor seed bed in early spring. These plants can be allowed to grow on in the seedbed for two years before planting them out in the winter. Cuttings of mature wood in late winter planted in the open ground[200].

nwatta A very tolerant and easily grown plant, it succeeds in almost any soil or situation[1] so long as it is not water-logged[11]. It grows well in heavy clay soils. Succeeds in cold exposed situations and tolerates industrial pollution[200]. Plants can be successfully transplanted even when quite large[200]. The flowers are delicately scented[245]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. This species is notably susceptible to honey fungus[200]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

5.1.33 Laburnum alpinum

Scotch Laburnum, Alpine Bea Tree, Alpine Golden Chain Tree

tfo2n 4 tlin 7 cyuc 0 kcaak 0 tcan 1 dwat 5 m hkuc hmimhmt cyutli kyuctcup hwicli hyishrasljutnyikfrip hpa7tli flatprikkwis hpa7tmwatli xre7t hjonli

drutta Laburnum alpinum is a deciduous Tree growing to 5 m (16ft) by 6 m (19ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to June, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

pcista All parts of the plant, and especially the seed, are poisonous[1, 61].

tcanta Miscellany WoodWood - hard. It is highly esteemed by turners[7] and is used for making musical instruments[245].

dwatta Chologogue Miscellany PurgativeThe leaves are chologogue and purgative[7]. The leaves have a similar effect to tobacco and have thus been used in treating nicotineism[7]. The plant is very poisonous and should not be used internally without expert supervision[7].

nrakta C. and S. Europe. Naturalized in Northern Britain. ksacta Stony hillsides[200] of mountain woodlands[7].

propta Seed - best sown as soon as it is ripe in a greenhouse or cold frame[200]. Germination is usually very quick and good[78]. Prick out indoor-sown seedlings into individual pots when they are large enough to handle and plant them out in the summer. Another option is to pre-soak the stored seed for 12 hours in warm water and sow in an outdoor seed bed in early spring. These plants can be allowed to grow on in the seedbed for two years before planting them out in the winter. Cuttings of mature wood in late winter planted in the open ground[200].

nwatta Landscape Uses:Espalier, Specimen. A very tolerant and easily grown plant, it succeeds in almost any soil or situation[1] so long as it is not water-logged[11]. It grows well in heavy clay soils and in poor shallow limestone soils[245]. Succeeds in cold exposed situations and tolerates industrial pollution[200]. This species is closely related to *L. anagyroides*[11]. There are some named varieties, selected for their ornamental value[11]. The flowers have a delicious vanilla scent[245]. Plants can be successfully transplanted even when quite large[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. This species is notably susceptible to honey fungus[200]. Special Features:Not North American native, All or parts of this plant are poisonous, Blooms are very showy.

5.1.34 Colutea arborescens

Bladder Senna
tfo2n 4 tlin 8 cyuc 0 kcaak 4 tcan 2 dwat 3.6 m hkuc hmimhmt cyutli hqatkyuctcup hwicli hyishrasljutnyikfrip hpa7tli flatprikkwis hpa7tmwatli xre7t hjonli

drutta Colutea arborescens is a deciduous Shrub growing to 3.6 m (11ft) by 3 m (9ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

pcista The seed is poisonous[9, 65].

tcanta Hedge Hedge Soil stabilizationThe plants have an extensive root system and are used to stabilize banks and prevent soil erosion[200]. Can be grown as a hedge[200]. Nitrogen Fixer.

dwatta Diuretic Emetic PurgativeThe leaves are diuretic and purgative[4, 9]. The leaves are sometimes used as a substitute for senna as a laxative, though they are much milder in their action[4]. The plant is rather unreliable when used medicinally so is rarely employed in herbalism[9]. The seeds are emetic[4]. They are also toxic[9].

nrakta S. Europe - Mediterranean. Naturalized in Britain[17]. ksacta Open woods, roadsides, railway banks etc[9], often on calcareous soils[89].

propta Seed - pre-soak for 24 hours in hot water and sow late winter in a greenhouse[113]. Scarification can help speed up the germination process[164]. Germination can be slow and erratic[200], though treated seed usually germinates in 1 - 3 months at 20°C[164]. As soon as they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out in late spring or early summer, after

dwatta Aperient Cathartic Chologogue Laxative Purgative Tonic VermifugeAlder buckthorn has been used medicinally as a gentle laxative since at least the Middle Ages[244]. The bark contains 3 - 7% anthraquinones, these act on the wall of the colon stimulating a bowel movement approximately 8 - 12 hours after ingestion[254]. It is so gentle and effective a treatment when prescribed in the correct dosages that it is completely safe to use for children and pregnant women[244]. The bark also contains anthrones and anthranols, these induce vomiting but the severity of their effect is greatly reduced after the bark has been dried and stored for a long time[254]. The bark is harvested in early summer from the young trunk and moderately sized branches, it must then be dried and stored for at least 12 months before being used[4, 238] The inner bark is cathartic, chologogue, laxative (the fresh bark is violently purgative), tonic, vermifuge[4, 9, 13, 21, 165]. It is taken internally as a laxative for chronic atonic constipation and is also used to treat abdominal bloating, hepatitis, cirrhosis, jaundice, and liver and gall bladder complaints[238]. It should be used with caution since excess doses or using the bark before it is cured can cause violent purging[9, 21]. Externally, the bark is used to treat gum diseases and scalp infestations[238], or as a lotion for minor skin irritations[244]. The fruit is occasionally used, it is aperient without being irritating[4]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve *Rhamnus frangula* for constipation (see [302] for critics of commission E).

nrakta Europe, including Britain, from Scandinavia south and east to N. Africa, the Urals and Siberia. ksacta Swamps and damp places, usually on moist heaths and damp open woods, preferring a peaty soil[9, 17, 21].

propta Seed - best sown in the autumn in a cold frame. Stored seed will require 1 - 2 months cold stratification at about 5° and should be sown as early in the year as possible in a cold frame or outdoor seedbed[200]. Germination is usually good, at least 80% by late spring. Prick out the seedlings into individual pots when they are large enough to handle, and grow them on in the greenhouse or cold frame for their first winter. Plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame[113]. Cuttings of mature wood of the current year's growth, autumn in a frame. Layering in early spring[4].

nwatta An easily grown plant, it succeeds in any reasonably good soil[11, 98], preferring neutral to acid conditions[238]. It grows well on damp or peaty soils[98]. Prefers a moist moderately fertile soil in sun or semi-shade[200]. Grows well in wet soils but not if they are water-logged[186]. Dislikes drought or exposure to strong winds[186]. Plants are hardy to at least -15°C[238]. Alder buckthorn is a slow-growing plant, though it coppices well. It was at one time often grown for its wood which was used in making charcoal[186]. The plants regenerate well after forest fires or grazing[186]. Plants flower on one-year old wood and also on the current year's growth[4]. Cultivated as a medicinal plant in S. Europe[57]. Often bears the aecidiospore stage of 'crown rust' of oats[1]. The species in this genus are notably resistant to honey fungus[200]. A good bee plant[4] and a main food plant for the larvae of the yellow brimstone butterfly[186]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is suckering with new plants from underground runners away from the plant [2-1].

4.2.251 Rhus vernix

Poison Sumach
3 tlin 7 cyuc 0 kcaak 0 tcan 1 dwat 3 m hkuc htut cyutli tcuphja7n hwicli hrasljutnyik hpa7tli flatprikkwis hpa7tmwatli nyanhjen hjonli

drutta Rhus vernix is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower in July, and the seeds ripen from September to November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees. The plant is not self-fertile. Suitable

for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist or wet soil.

pcista This plant contains toxic substances and skin contact with it can cause severe irritation to some people[11]. The sap is extremely poisonous[11]. The sap contains 3-N pentadecacyctechnol. Many people are exceedingly sensitive to this, it causes a severe spreading dermatitis. The toxins only reach the skin if the plant tissues have been damaged, but even indirect contact can cause severe problems[200].

tcanta Dye Ink Miscellany Mordant Oil Varnish WoodThe leaves are rich in tannin. They can be collected as they fall in the autumn and used as a brown dye or as a mordant[169]. An oil is extracted from the seeds[4]. It attains a tallow-like consistency on standing and is used to make candles. These burn brilliantly, though they emit a pungent smoke[4]. An inedible black ink can be made from the sap[226]. A varnish is obtained from the sap, it is black, lustrous and durable[19, 82].The final product is toxic[226]. Wood - light, soft, coarse grained[82]. It weighs 27lb per cubic foot[235].

dwatta Febrifuge Miscellany SkinPoison sumach has occasionally been used medicinally, though it is an extremely poisonous plant and great caution should be exercised. Any herbal use should only be undertaken under the supervision of a qualified practitioner. See also the notes above on toxicity. The plant has been used in the treatment of fevers, ague, ulcerated bladder, asthma and wasting diseases[257]. The plant has been used as a wash to treat foul ulcers[257].

nrakta Eastern N. America - Maine to Vermont and Ontario, south to Florida, Missouri and Louisiana. ksacta Wooded swamps, often inundated for part of the year[4, 43, 82].

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

nwatta Succeeds in a well-drained fertile soil in full sun[11, 200]. Requires a moist soil[14]. The young growth in spring can be damaged by late frosts. Plants have brittle branches and these can be broken off in strong winds[200]. Plants are also susceptible to coral spot fungus[11]. Plants in this genus are notably resistant to honey fungus[200]. Many of the species in this genus, including this one, are highly toxic and can also cause severe irritation to the skin of some people, whilst other species are not poisonous. It is relatively simple to distinguish which is which, the poisonous species have axillary panicles and smooth fruits whilst non-poisonous species have compound terminal panicles and fruits covered with acid crimson hairs[1, 4]. The toxic species are sometimes separated into their own genus, Toxicodendron, by some botanists[200]. Dioecious. Male and female plants must be grown if seed is required.

4.2.252 Eupatorium capillifolium

Dogfennel
3 tlin 10 cyuc 0 kcaak 0 tcan 1 dwat 3 m hkuc hmimhmt cyutli tcup hwicli hrasljutnyik hpa7tli flatprikkwis hpa7tmwatli fyifxre7t hjonli

drutta Eupatorium capillifolium is a PERENNIAL growing to 3 m (9ft 10in). The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

tcanta Repellent StrewingThe plant is used as a strewing herb and to discourage insects[61].

dwatta StingsThe entire plant is applied externally as a remedy for the bites of reptiles and insects[61].

nrakta Eastern N. America - New Jersey to Vancouver, south to Florida. ksacta Borders of woods, clearings, fields and roadsides[43]. Disturbed areas, mainly in sandy soils in Texas[274].

propta Seed - sow spring in a cold frame and only just cover the seed. Prick out the seedlings into individual pots when they are large enough to handle and plant them out into their permanent positions in the summer. Division in spring or autumn[111]. Very easy, the clumps can be replanted direct into their permanent positions.

nwatta We have very little information on this species but, judging by its habitat, it should be hardy in Britain. Other members of this genus succeed in ordinary well-drained but moisture retentive garden soil in sun or part shade[200]. Plants seem to be immune to the predations of rabbits[233]. An aggressive and weedy species[43]. Special Features: North American native, Invasive.

4.2.253 *Filipendula rubra*

Queen Of The Prairie, Meadowsweet

3 tin 9 cyuc 0 kcaak 0 tcan 1 dwat 2.5 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyikfrip hpa7tli prikliwis hpa7tmwatli fyfuxre7t hjonli

drutta *Filipendula rubra* is a PERENNIAL growing to 2.5 m (8ft) by 1.3 m (4ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 2. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

dwatta Analgesic Antiinflammatory Astringent Cardiac DysenteryThe root is rich in tannin, it is used as an astringent in the treatment of diarrhoea, dysentery, bleeding etc[222]. It has also been used in the treatment of various heart complaints[257]. The plant probably contains salicylic acid, the chemical forerunner of aspirin[222]. This is anti-inflammatory and analgesic[222].

nrakta Eastern N. America - Pennsylvania to Georgia, west to Michigan and Iowa. ksacta Moist meadows and bogs[222].

propta Seed - best sown in the autumn in a cold frame[1]. The seed can also be sown in a cold frame in spring, germinating best at a temperature of 10 - 13°C[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer if they have grown enough. If not, keep them in a cold frame for the winter and plant them out in late spring. Division in autumn or winter[200]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Landscape Uses:Border, Container, Specimen. Requires a humus-rich moist soil in semi-shade[200]. Succeeds in full sun only if the soil is reliably moist throughout the growing season[200]. Dislikes dry or acid soils[1, 17]. Does well in marshy soils[24, 200]. Grows well in heavy clay soils. Plants can be grown in quite coarse grass, which can be cut annually in the autumn[233]. Although the plants are perfectly hardy in Britain, they appreciate the winter protection of bracken or some similar mulch when grown in areas of prolonged frosts[200]. Plants spread fairly freely and form large clumps[233]. There is at least one named variety, selected for its ornamental value[200]. The flowers are very attractive to bees[24, 30]. Members of this genus are rarely if ever troubled by browsing deer[233]. Special Features:Attractive foliage, North American native, Suitable for cut flowers.

4.2.254 *Silphium perfoliatum*

Cup Plant, Rosinweed

3 tin 7 cyuc 0 kcaak 0 tcan 2 dwat 2.5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Silphium perfoliatum* is a PERENNIAL growing to 2.5 m (8ft 2in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in July, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

dwatta Alterative Antispasmodic Diaphoretic Emmenagogue Febrifuge Hepatic Pectoral Stipulant Styptic Tonic Women's complaintsCup plant was employed medicinally by several native North American Indian tribes who used it to treat a variety of complaints[257]. It is little, if at all, used in modern herbalism. A decoction of the root has been used to treat the stoppage of periods, and also to treat morning sickness and to prevent the premature birth of a child[257]. In view of these conflicting uses, it is best that it is not used by pregnant women unless under the guidance of a qualified practitioner[257]. The root is alterative, antispasmodic, diaphoretic, emmenagogue, febrifuge, hepatic, stimulant, styptic and tonic. It is used in the treatment of liver and spleen disorders and has also been used to treat morning sickness[4, 61, 257]. A decoction of the root has been used internally in the treatment of back and chest pain and lung haemorrhages[257]. A decoction of the root has been used as a face wash to treat paralysis[257]. A poultice of the moistened dried root has been applied to wounds to stop the bleeding[257].

nrakta Eastern N. America - Ontario to South Dakota, south to Georgia, Missouri and Oklahoma. ksacta Rich woods, thickets, river banks and prairies[43].

propta Seed - best sown as soon as it is ripe in a greenhouse[200]. Prick out the seedlings into individual pots as soon as they are large enough to handle and plant them out in the summer. Division in spring[188]. This is very difficult due to the deep and extensive root system.

nwatta Landscape Uses:Border, Massing, Specimen, Woodland garden. Succeeds in any ordinary garden soil[1]. Prefers a deep moisture retentive moderately fertile soil that is not too nitrogen rich, in sun or dappled shade[200]. Hardy to at least -25°C[187]. Plants have a deep and extensive root system which makes transplanting difficult. An aromatic resin exudes from the crushed leaves and stems[245]. Special Features: Attracts birds, Attractive foliage, North American native, Naturalizing, Attracts butterflies. The plant is heat tolerant in zones 9 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

4.2.255 *Echinacea angustifolia*

Echinacea, Blacksamson echinacea, Strigose blacksamson 3 tin 8 cyuc 0 kcaak 2 tcan 5 dwat 1.2 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Echinacea angustifolia* is a PERENNIAL growing to 1.2 m (4ft) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

the growing plant but some can also be used by other plants growing nearby[200]. Special Features: North American native, Naturalizing, Attractive flowers or blooms.

5.1.29 *Vicia cracca*

Tufted Vetch, Bird vetch, Cow vetch

tfo2n 4 tin 8 cyuc 1 kcaak 3 tcan 1 dwat 1.8 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyfuxre7t hjonli

drutta *Vicia cracca* is a PERENNIAL CLIMBER growing to 1.8 m (6ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

ckakta Edible Parts: Leaves SeedEdible Uses: TeaSeed-cooked[2, 22, 105]. They are boiled or roasted[183]. Leaves and young stems - cooked[105]. Used as a potherb[183]. The leaves are a tea substitute[183].

tcanta Green manureCan be used as a green manure[46]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta GalactagogueThe cooked plant is used as a galactagogue[218].

nrakta Northern Europe, including Britain, to Japan in northern Asia. ksacta Grassy and bushy places, avoiding acid soils[13, 17].

propta Pre-soak the seed for 24 hours in warm water and then sow in situ in spring or autumn.

nwatta Succeeds in any well-drained soil in a sunny position if the soil is reliably moist throughout the growing season, otherwise it is best grown in semi-shade[200]. This species has occasionally been cultivated as a food plant, but yields are too low to make it very worthwhile[2]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. Growth habit is a single or multiple shooting vine from a crown [1-2]. Herbaceous. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

5.1.30 *Lathyrus palustris*

Slenderstem Peavine, Marsh pea

tfo2n 4 tin 8 cyuc 1 kcaak 0 tcan 0 dwat 1.2 m hkuc htut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Lathyrus palustris* is a PERENNIAL CLIMBER growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist or wet soil.

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

ckakta Edible Parts: Leaves SeedEdible Uses: Seed-cooked[105, 161, 179]. The fully grown seeds are shelled and cooked as a vegetable[257]. Some caution is advised, see the notes above on toxicity. Young leaves and stems - cooked[177].

nrakta Europe, including Britain, from Norway south and east to N. Spain, Siberia and Japan. E. N. America ksacta Fens and damp places in grass or bushes[17],

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

nwatta A good plant for the bog or marsh garden, succeeding in wet soils[1, 200]. It is easily grown in any moderately good garden soil, preferring a position in full sun[200]. Plants climb by means of tendrils[188]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

5.1.31 *Alnus japonica*

Japanese Alder

tfo2n 4 tin 8 cyuc 0 kcaak 0 tcan 1 dwat 22 m hkuc hmimhtut cyutli kyuctcuphja7n hwicli hysjlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli hjonli

drutta *Alnus japonica* is a deciduous Tree growing to 22 m (72ft 2in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from February to March. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. It can fix Nitrogen. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry moist or wet soil. The plant can tolerate strong winds but not maritime exposure.

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

dwatta CancerVarious species of alder, including this species, seem to contain antitumour compounds[218].

nrakta E. Asia - China, Japan. ksacta Wet lowlands all over Japan[58].

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

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

5.1.32 *Laburnum anagyroides*

Laburnum, Golden chain tree

tfo2n 4 tin 8 cyuc 0 kcaak 4 tcan 1 dwat 6 m hkuc hmimhtut cyutli kyuctcup hwicli hysishrasjlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Laburnum anagyroides* is a deciduous Tree growing to 6 m (19ft) by 6 m (19ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower

Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

ksakta Edible Parts: LeavesEdible Uses: Leaves - cooked and used as a greens[212].

tcanta Dynamic accumulator.

nrakta Western N. America - Idaho to Washington and California. ksacta Dry, often rocky soils, usually amongst sagebrush or under yellow pine[212].

propta Pre-soak the seed for 12 hours in warm water and then sow in spring in situ. If the seed is in short supply it might be better to sow it in pots in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in late spring. Division in spring.

nwatta Succeeds in a moist, well-drained circum-neutral soil in full sun[200]. Succeeds in poor soils. It grows well in an apple orchard, the trees will produce tastier fruit that stores better[201]. It should not be grown with camellias or gooseberries because it harbours a mite that can cause fruit drop in the gooseberries and premature budding in the camellias[201]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. Buttercups growing nearby depress the growth of the nitrogen bacteria by means of a root exudate[201].

5.1.27 *Alnus viridis crispa*

American Green Alder

tfo2n 4 tin 8 cyuc 1 kcaak 3 tcan 2 dwat 3 m hkuc hmimhtut cyuti tucpha7n hwicli hysijlutnyikfripr hpa7tli flat-prikkwis hpa7tmwatli hjonli

drutta *Alnus viridis crispa* is a deciduous Shrub growing to 3 m (9ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from April to May. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. It can fix Nitrogen. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

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

tcanta Dye TeethAn orange-red to brown dye can be obtained from the bark[257]. Nitrogen fixer.

dwatta Abortifacient Appetizer Astringent Emetic Emmenagogue Haemostatic Poultice Skin Stomachic Tonic-The bark is astringent, emetic, haemostatic, stomachic and tonic[172]. The bark was burnt as an inhalant in the treatment of rheumatism[257]. The ashes were also used as a tooth cleaner[257]. A decoction of the inner bark has been used as a carminative to reduce gas in the stomach and as a febrifuge[257]. A decoction of the plant has been used in a steam treatment to bring about menstruation - it has been used as an abortifacient[257]. A poultice of the leaves has been used to treat infected wounds or sores[257]. The poultice was left in place over the wound until the leaves stuck to it and was then pulled off, removing the 'poison' with it[257]. An infusion of the plant tops was given to children with poor appetites[257].

nrakta Eastern N. America - Labrador to Alaska and Newfoundland and southwards. ksacta Rocky shores, slopes and mountains[43]. Singly or in thickets along streams, lakeshores, coasts, and bog or muskeg margins, or on sandy or gravelly slopes or flats, from sea level to 2000 metres[270].

propta Seed - best sown in a cold frame as soon as it is ripe and only just covered[200]. Spring sown seed should also germinate successfully so long as it is not covered[200, K]. The seed should germinate in the spring as the weather warms up. When large enough to handle, prick the seedlings out into individual pots. If growth is sufficient, it is possible to plant them out into their permanent positions in the summer, otherwise keep them in pots outdoors and plant them out in the spring. If you have sufficient quantity of seed, it can be

sown thinly in an outdoor seed bed in the spring[78]. The seedlings can either be planted out into their permanent positions in the autumn/winter, or they can be allowed to grow on in the seed bed for a further season before planting them. Cuttings of mature wood, taken as soon as the leaves fall in autumn, outdoors in sandy soil.

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

5.1.28 *Robinia neomexicana*

New Mexico Locust, Rusby's Locust, Locust
tfo2n 4 tin 8 cyuc 1 kcaak 0 tcan 1 dwat 2 m hkuc hmimhtut cyuti hgakuyuctup hwicli hyishrasjlutnyik hpa7tli flatprikkwis hpa7tmwatli xre7t hjonli

drutta *Robinia neomexicana* is a deciduous Tree growing to 2 m (6ft 7in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. It can tolerate atmospheric pollution.

pcista The bark, root and seed are said to be poisonous[155].

ksakta Edible Parts: Flowers Seed SeedpodEdible Uses: Flowers - raw or cooked[105, 155, 161, 183, 257]. They can be used as a flavouring in cooked dishes[257]. The flowers can be boiled, then dried and stored for later use[257]. Seed-pods - raw or cooked[229, 257]. They are gathered in the fall and eaten when fresh[229]. The pods can also be cooked then dried and stored for later use[257]. Seed - cooked[229, 257].

tcanta Fodder Soil stabilization WoodPlants succeed in dry barren sites, their suckering habit making them suitable for stabilizing banks[200, 229]. Wood - tough, elastic and durable[155, 257]. Used for fence posts etc[155].

dwatta Antirheumatic EmeticAntirheumatic[149, 216]. An emetic, it is used to clear the stomach[216, 257].

nrakta South-western N. America - Texas to New Mexico, Utah and Nevada. ksacta Mountain canyons and plains[82], generally in sunny positions in moist soils by streams[149], 1200 - 2500 metres[229].

propta Seed - pre-soak for 48 hours in warm water and sow the seed in late winter in a cold frame[80]. A short stratification improves germination rates and time[80]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in the following summer. The seed stores for over 10 years[113]. Suckers taken during the dormant season.

nwatta Agroforestry Services: Nitrogen Fodder: Bank Industrial Crop: Biomass Management: Coppice Regional CropLandscape Uses:Specimen. Succeeds in a hot dry position. Succeeds in any soil, preferring one that is not too rich[1, 200]. Requires a well-drained soil, succeeding on dry barren sites[200]. Plants are tolerant of drought and atmospheric pollution[200]. The branches are brittle and very liable to wind damage[200]. When plants are grown in rich soils they produce coarse and rank growth which is even more liable to wind damage[11, 200]. Plants can be coppiced[155]. Any pruning should be done in late summer in order to reduce the risk of bleeding[200]. Plants in this genus are notably resistant to honey fungus[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by

pcista possible suppression of immunity with habitual use. High doses over 1000 mg may cause dizziness. Use of herb for 10-14 days recommended followed by a short break.

tcanta Attracts butterflies and beneficial insects including parasitic Wasps. General insect (especially bees) nectar plant. Butterfly nectar plant. Shelter plant for beneficial insects. Wildlife Food - seed-eating birds - a favorite of the American Goldfinch. Pioneer Plant - helps reestablish overused or damaged land. Drought Plant - this species can tolerate prolonged dry conditions once established.

dwatta Adaptogen Alternative Antiseptic Depurative Diaphoretic Digestive Sialagogue Stings UrinaryEchinacea is one of the world's most important medicinal herbs. Research shows that it has the ability to raise the body's resistance to bacterial and viral infections by stimulating the immune system[254]. It is also antibiotic and helps to relieve allergies[254]. Plants in this genus were probably the most frequently used of all North American Indian herbal remedies. They had a very wide range of applications and many of these uses have been confirmed by modern science. The plant has a general stimulatory effect on the immune system and is widely used in modern herbal treatments[222]. There has been some doubt over the ability of the body to absorb the medicinally active ingredients orally (intravenous injections being considered the only effective way to administer the plant), but recent research has demonstrated significant absorption from orally administered applications[222]. In Germany over 200 pharmaceutical preparations are made from Echinacea[222]. The roots and the whole plant are considered particularly beneficial in the treatment of sores, wounds, burns etc, possessing cortisone-like and antibacterial activity[222]. The plant was used by North American Indians as a universal application to treat the bites and stings of all types of insects[213]. An infusion of the plant was also used to treat snakebites[213]. The root is adaptogen, alternative, antiseptic, depurative, digestive, sialagogue[4, 21, 61, 165]. It is harvested in the autumn and dried for later use[238]. The plant has been used as a diaphoretic[213]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Echinacea for common cold, cough and bronchitis, fevers and cold, urinary tract infections, inflammation of the mouth and pharynx, increase resistance to infection, wounds and burns (see [302] for critics of commission E).

nrakta N. America - Manitoba, Saskatchewan and North Dakota south to Texas. ksacta Gravelly, sandy, and rocky dry limestone prairies and barrens[43, 274].

propta Seed - sow March/April in a greenhouse and only just cover the seed[175, K]. Diurnal temperature fluctuations aid germination[175]. The seed usually germinates in 10 - 21 days at 25°C[175]. Prick out the seedlings into individual pots once they are large enough to handle and grow them on in the greenhouse for the first summer. Plant them out in the late spring or early summer of the following year and give them some protection from slugs at least until they are established[K]. Division in spring or autumn[111]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring. Root cuttings, October in a frame[200].

nwatta Prefers a deep rich loam with plenty of leaf-mold[11] and a sunny position[175]. Closely related to *E. pallida* and included in that species by some botanists[274]. Slugs love this plant[K]. USDA Hardiness Zone: Zone 3-8, AHS Heat Zone: 9-1 In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fleshy. Thick or swollen - fibrous or tap root [2-1].

4.2.256 *Alchemilla mollis*

Lady's-mantle

3 tin 8 cyuc 0 kcaak 3 tcan 0 dwat m hkuc pcmhmimhtut cyuti tucp hwicli hrasjlutnyikfripr hpa7tli flat-prikkwis hpa7tmwatli fyi7t hjonli

drutta *Alchemilla mollis* is a deciduous Perennial growing to 0.6 m (2ft) by 0.8 m (2ft 6in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. The plant is self-fertile. Suitable for: light (sandy), medium

(loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil. It cannot tolerate atmospheric pollution.

tcanta A good ground cover plant. Grow as ground cover in shade or beneath open shrubs and trees. Will self-seed into gravel or cracks between paving. Great at the front of borders, as edging for paths or massed as a ground cover. A clump-forming perennial forming dense, leafy mounds of light green leaves.

nrakta Native to southern Europe and grown throughout the world as an ornamental. ksacta Moist meadows, open woods, pastures and also on rock ledges in mountainous areas

propta Seed - sow spring in a cold frame. The seed usually germinates in 3 - 4 weeks at 16c[133]. When large enough to handle, prick the seedlings out into individual pots and grow them on a cold frame for their first winter, planting out in late spring or early summer. Division in spring or autumn. The divisions can be planted out direct into their permanent positions, though we find it best to pot them up and keep them in a sheltered position until they are growing away well.

nwatta A low growing herbaceous perennial plant making an excellent ground cover that grows in a clumping manner. Moist but well-drained soil in sun to partial shade. Sun exposure: Full sun, dappled shade, partial shade. Shade type: Damp. Hardiness: Hardy. Soil type: Well drained,blight, sandy, clay, heavy, moist. Soil pH:5.5 to 7.5. Hardiness Zones:3 to 8. The plant tolerates close to full shade. The Royal Horticultural Society has given it its prestigious Award of Garden Merit (AGM). Dies down completely in winter.

4.2.257 *Spiraea tomentosa*

Hardhack, Steeplebush

3 tin 7 cyuc 0 kcaak 0 tcan 2 dwat 1.5 m hkuc hmimhtut cyuti tucp hwicli hrasjlutnyik hpa7tli flatprikkwis hpa7tmwatli xre7t hjonli

drutta *Spiraea tomentosa* is a deciduous Shrub growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

dwatta Astringent Birthing aid Diuretic Dysentery TonicThe flowers give feebly the medicinal action of salicylic acid (aspirin) and are used in decoction for their diuretic and tonic effect[4]. An infusion of the flowers is used as an astringent[207]. An infusion of the leaves can be used in the treatment of dysentery[257]. An infusion of the flowers and the leaves has been used to counteract the sickness of pregnancy and also to facilitate childbirth[257]. The roots are astringent and have been used in the treatment of diarrhoea[4, 207]. An infusion of the leaves is also used[4, 213].

nrakta N. and C. Europe. Eastern N. America - Nova Scotia to Manitoba, south to Georgia and Kansas. ksacta Fields and pastures in N. America[222]. Swamps and low ground[235].

propta Seed - we have no information for this species but suggest sowing the seed as soon as it is ripe in a cold frame if possible. It is likely to require stratification before it germinates, so stored seed should be sown in a cold frame as early in the year as you receive it. Prick out the seedlings into individual pots when they are large enough to handle, and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a light sandy soil a frame. Cuttings of mature wood of the current seasons growth, 15cm long, October/November in an outdoor frame[200]. Another report says that September is a good time to do this[11]. Division of suckers in early spring[200]. They can be planted out straight into their permanent positions.

nwatta Tolerates most soils[200], but prefers a good loamy soil, abundant moisture and full sunlight[11, 200]. A

vigorous plant, spreading by subterranean suckers and forming thickets[200]. Closely related to *S. douglasii*[11]. Hybridizes freely with other members of this genus[11].

4.2.258 *Veronicastrum virginicum*

Beaumont's Root, Culver's root, Bowman's Root, Culver's Root, Black Root

3 tlin 9 cyuc 0 kcaak 0 tcan 3 dwat 1.2 m hkuc
htut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta *Veronicastrum virginicum* is a PERENNIAL growing to 1.2 m (4ft) by 0.5 m (1ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

dwatta Cathartic Cholagogue Emetic Hepatic Laxative Tonic Beaumont's root was employed medicinally by several native North American Indian tribes who used it to treat a variety of complaints[257]. It is still occasionally used in modern herbalism, mainly for its effect upon the liver and bile production. Some caution is advised, the plant is potentially toxic[222]. The root is anodyne, cathartic, emetic, hepatic, laxative and tonic[4, 46, 61, 165, 218, 222]. The fresh root is a violent cathartic and possibly emetic, the dried root is milder in its action, but less certain[4]. The root also greatly excites the liver and increases the flow of bile[4, 238]. An infusion has been used in the treatment of diarrhoea, coughs, chills and fevers, and also to ease the pain of backaches[257]. A tea made from the roots is strongly laxative[213, 222]. The roots are harvested in the autumn and should be stored for at least a year before use[213].

nrakta Eastern N. America - Ontario to Manitoba, south to Massachusetts, Alabama and Texas. ksacta Meadows, rich woods, thickets and prairies[43].

propta Seed - sow autumn in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. If you have sufficient quantity the seed can be sown outdoors in situ in the autumn or the spring. Division in autumn or spring[200]. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring.

nwatta Landscape Uses:Border, Massing, Seashore, Woodland garden. Easily grown in a moderately fertile moisture retentive well drained soil[200]. Prefers cool summers[200]. Prefers a sunny position[188]. Hardy to at least -20°C[187]. Some named forms have been selected for their ornamental value[200]. Special Features:North American native, Attracts butterflies, Extended bloom season in Zones 9A and above.

4.2.259 *Eupatorium maculatum*

Joe Pye Weed, Spotted Joe pye weed

3 tlin 7 cyuc 0 kcaak 0 tcan 2 dwat m hkuc
hmimhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta *Eupatorium maculatum* is a PERENNIAL growing to 1.5 m (5ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

tcanta StrawThe stems have been used as straws[257]. dwatta Antirheumatic Diaphoretic Diuretic KidneyA tea made from the whole herb is diuretic[222]. It is used in the treatment of kidney complaints, painful urination, rheumatism etc[61, 222]. The leaves and stems are harvested in the summer before the flower buds open, and are dried for later

use[238]. A tea made from the roots is used in the treatment of fevers, colds, kidney and liver complaints, rheumatism etc[222, 257]. It is said to have a tonic effect upon pregnant women[257] and is also said to induce sweating[222]. Externally, a decoction of the roots is used as a wash on rheumatic joints[257]. The roots are harvested in the autumn and dried for later use[238].

nrakta South-eastern and Central N. America - Newfoundland to British Columbia by Washington and New York. ksacta Damp thickets, meadows, shores etc, usually on rich or calcareous soils from Quebec and southwards[43].

propta Seed - sow spring in a cold frame and only just cover the seed. Prick out the seedlings into individual pots when they are large enough to handle and plant them out into their permanent positions in the summer. Division in spring or autumn[111]. Very easy, the clumps can be replanted direct into their permanent positions.

nwatta Landscape Uses:Border, Erosion control, Massing, Seashore, Specimen, Woodland garden. Succeeds in ordinary garden soil that is well-drained but moisture retentive in sun or part shade[200]. This species is hardy to about -25°C[187]. Plants seem to be immune to the predations of rabbits[233]. Special Features: Attractive foliage, North American native, Naturalizing, Attracts butterflies, Suitable for cut flowers.

4.2.260 *Cimicifuga heracleifolia*

Komarov's Bugbane

3 tlin 7 cyuc 0 kcaak 0 tcan 2 dwat 1 m hkuc
hmim cyutli tcup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Cimicifuga heracleifolia* is a PERENNIAL growing to 1 m (3ft 3in) by 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from August to September, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

pcista Although no specific mention of toxicity has been seen for this species, it does belong to a family that contains a number of toxic species and at least one species in this genus is said to be mildly poisonous. Some caution is therefore advised.

dwatta Analgesic Antibacterial Antipyretic Antiviral SedativeThe root is analgesic, antibacterial, antiviral, febrifuge and sedative[176, 279]. It is used internally in the treatment of common cold with headache and sore throat, measles, headache, gingivitis, stomatitis, prolapse of the rectum and uterus[176]. The root is harvested in the autumn and used fresh or dried[238]. Use with caution[176], see the notes above on toxicity.

nrakta E. Asia - Eastern Russia to Northern China. ksacta Scrub and grassy slopes from sea level to 1000 metres[266].

propta Seed - best sown as soon as it is ripe in a cold frame[1]. Only just cover the seed. It germinates in 1 - 12 months or even longer at 15°C[164]. The seed does not store well and soon loses its viability[200], stored seed may germinate better if given 6 - 8 weeks warm stratification at 15°C and then 8 weeks cold stratification[164]. Prick out the young seedlings into individual pots when they are large enough to handle and grow them on in a frame for their first winter. Plant out in late spring or early summer[K]. Division in spring or autumn[1]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the summer or following spring.

nwatta Prefers a moist humus rich soil and some shade[1, 200]. Succeeds in ordinary garden soil[1]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

4.2.261 *Artemisia vestita*

Russian Wormwood

3 tlin 7 cyuc 0 kcaak 0 tcan 1 dwat 1.2 m hkuc

both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). The plant is self-fertile. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves SeedEdible Uses: Seed - cooked[2, 105, 177]. Used like lentils[2], the seed can be eaten as a staple food[178]. Leaves and stems - cooked[105, 177, 178]. Used as a vegetable[272]

tcanta General insect (especially bees) nectar plant. Shelter plant for beneficial insects including lacewings, parasitic Wasps, beetles and spiders. Pioneer Species - helps reestablish overused or damaged land. Nitrogen Fixing Plant - this plant creates its own nitrogen through a symbiotic relationship with microorganisms (bacteria) in its roots. Dynamic Accumulator Species - Potassium, Phosphorus, Nitrogen.

nrakta Europe, including Britain, from Norway south and east to N. Africa and W. Asia. ksacta Grassy places. A common weed of cultivation, avoiding acid soils[17].

propta Pre-soak the seed for 24 hours in warm water and then sow in situ in spring or autumn.

nwatta Succeeds in any well-drained soil in a sunny position if the soil is reliably moist throughout the growing season, otherwise it is best grown in semi-shade[200]. Occasionally cultivated for its edible seed which is used as a lentil substitute[2]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. When removing plant remains at the end of the growing season, it is best to only remove the aerial parts of the plant, leaving the roots in the ground to decay and release their nitrogen.

5.1.24 *Robinia luxurians*

New Mexico locust

tfo2n 4 tlin 8 cyuc 1 kcaak 0 tcan 0 dwat 8 m hkuc
hmimhtut cyutli h gatkyuctcup hwicli vyhshrasljutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Robinia luxurians* is a deciduous Tree growing to 8 m (26ft 3in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. It can tolerate atmospheric pollution.

kcakta Edible Parts: FlowersEdible Uses: Flowers - raw[105].

tcanta Soil stabilization WoodPlants succeed in dry barren sites, their suckering habit making them suitable for stabilizing banks[200]. Wood - heavy, exceedingly hard, strong, close-grained[82].

nrakta South-western N. America - New Mexico. ksacta Banks of mountain streams to elevations of 2100 metres[82].

propta Seed - pre-soak for 48 hours in warm water and sow the seed in late winter in a cold frame[80]. A short stratification improves germination rates and time[80]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in the following summer. The seed stores for over 10 years[113]. Suckers taken during the dormant season.

nwatta Succeeds in any soil, preferring one that is not too rich[1, 200]. Requires a well-drained soil, succeeding on dry barren sites[200]. Plants are tolerant of drought and atmospheric pollution[200]. Succeeds in a hot dry position. The branches are brittle and very liable to wind damage[200]. When plants are grown in rich soils they produce coarse and rank growth which is even more liable to wind damage[11, 200]. Any pruning should be done in late summer in order to reduce the risk of bleeding[200]. Plants in this genus are notably resistant to honey fungus[200]. The flowers are fragrant[245]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nod-

ules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

5.1.25 *Maackia amurensis*

Chinese Yellow Wood, Amur maackia

tfo2n 4 tlin 7 cyuc 1 kcaak 4 tcan 0 dwat 6 m hkuc
htut cyutli kyuctcup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Maackia amurensis* is a deciduous Shrub growing to 6 m (19ft) by 6 m (19ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from July to August, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young leaves - cooked[105, 177].

tcanta WoodWood - heavy, strong, very hard. Used for the interior of houses, utensils, tool handles etc[46, 61]. Nitrogen Fixer.

nrakta E. Asia - China, northern and central Japan, Korea. ksacta Forests on hill slopes at elevations of 300 - 900 metres in Hebei, Heilongjiang, Jilin, Liaoning, Nei Mongol and Shandong Provinces, China[266].

propta Pre-soak the seed for 24 hours in hot water and then sow it in a cold frame in the autumn[200]. The seed can also be pre-soaked and sown in late winter in a greenhouse[78]. Variable germination. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Root cuttings 4cm long in December. Good percentage[78].

nwatta Landscape Uses:Pest tolerant, Specimen, Street tree. Succeeds in most soils and situations, including deep soils over chalk and dry soils[1, 200]. Prefers a good soil in a sunny position[1]. Prefers a well-drained sandy soil[245]. A very hardy plant, tolerating temperatures down to about -25°C[200]. A polymorphic species[58]. It is closely related to the genus *Cladrastis*[200], and sometimes included in that genus[245]. Plants flower when quite young[200]. The flowers have a powerful scent of vanilla[245]. Transplants readily, even when fairly large[200], but the mature plants resent pruning[200]. Plants in this genus are notably resistant to honey fungus[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. Special Features:Not North American native, Attractive flowers or blooms. The plant is heat tolerant in zones 7 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polymorphic design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2].

5.1.26 *Trifolium macrocephalum*

Bighead Clover, Largehead clover

tfo2n 4 tlin 8 cyuc 1 kcaak 3 tcan 0 dwat m hkuc
htut cyutli tcup hwicli vyhshrasljutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Trifolium macrocephalum* is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 4. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix

mature seeds and the immature seedpods can be used[257]. The pod is about 3cm long and contains 4 - 7 seeds[235].

tcanta StringThe stout roots have been used for tying[257]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch. Nitrogen Fixer.

dwatta Ophthalmic Salve StingsThe leaves have been rubbed in the hands and applied to spider bites[257]. An infusion of the crushed leaves have been used as a bath for treating soreness[257]. An infusion of the plant has been used as an eyewash[257]. An infusion of the leaves has been used by women as a love medicine[257].

nrakta N. America - Alaska to Ontario and New York, south to Virginia, Kentucky and Arizona. ksacta Damp or gravelly slopes, thickets and meadows[43].

propta Pre-soak the seed for 24 hours in warm water and then sow in situ in spring or autumn.

nwatta We have very little information on this species and do not know if it will be hardy in Britain, though judging by its native range it should succeed outdoors in many parts of the country. The following notes are based on the general needs of the genus. Succeeds in any well-drained soil in a sunny position if the soil is reliably moist throughout the growing season, otherwise it is best grown in semi-shade[200]. A climbing plant, attaching itself to supports by means of tendrils[212]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. Growth habit is a single or multiple shooting vine from a crown [1-2]. Herbaceous. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

5.1.21 Vicia gigantea

Giant Vetch

tfo2n 4 tlin 8 cyuc 2 kcak 3 tcan 1 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta Vicia gigantea is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: SeedEdible Uses: Young seed - raw or cooked[256]. The seeds are produced in pods 2 - 5cm long, each pod containing 3 - 4 round seeds the size of small peas[256]. They are eaten, when young, like green peas[2, 105, 118, 161], the flavour even of young seeds is rather strong, like old garden peas[256]. Some native North American Indian tribes regarded the seeds as poisonous, though other tribes would eat them as a snack. The pods were harvested when green and then roasted in an open fire until the pods started to split open. The seeds were then removed and eaten[256].

tcanta HairAn infusion of the roots has been used as a tonic hair wash and anti-dandruff treatment[257]. Nitrogen fixer. Dynamic accumulator.

dwatta Antidandruff LaxativeThe roots are laxative[257]. An infusion of the roots has been used as a tonic hair wash and anti-dandruff treatment[257].

nrakta Western N. America - Alaska to California. ksacta Moist places in California, especially in redwood forests[71].

propta Pre-soak the seed for 24 hours in warm water and then sow in situ in spring or autumn.

nwatta We have very little information on this species and do not know if it will be hardy in Britain, though judging by its native range it should succeed outdoors in many parts of the country. The following notes are based on the general needs of the genus. Prefers a fairly heavy loam but succeeds in a sunny position in most soils that are well-drained[200]. Grows well in heavy clay soils.

5.1.22 Medicago lupulina

Black Medick

tfo2n 4 tlin 8 cyuc 2 kcak 4 tcan 1 dwat 0.5 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta Medicago lupulina is a ANNUAL/PERENNIAL growing to 0.5 m (1ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). The plant is self-fertile. It can fix Nitrogen. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Leaves SeedEdible Uses: Leaves - cooked[105]. Used as a potherb[183]. A nutritional analysis is available[218]. Seed - cooked[2, 105, 161]. Parched and eaten or ground into a powder[183]. The seed is said to contain trypsin inhibitors[218]. These can interfere with certain enzymes that help in the digestion of proteins, but are normally destroyed if the seed is sprouted first.

tcanta Green manureA good green manure plant, it is fairly deep rooted, has good resistance to 'Clover rot' but it is not very fast growing[87]. It can be undersown with cereals, succeeding even in a wet season[87].

dwatta Antibacterial LenitiveAqueous extracts of the plant have antibacterial properties against micro-organisms[218, 240]. The plant is lenitive[218, 240]. One of our users has sent the following information 'Trypsin inhibitors can be inactivated by the application of heat, for example, boiling for 9 minutes. (Trypsin inhibitors are found in soy). L-canavanine can be destroyed by heat as well. Major saponins in alfalfa but also black medick, known as medicagenic acid and its derivatives, have major antifungal/antimycotic activity that could lend to better medical applications than existing antimycotic drugs that are limited in number and abilities. Medical applications meaning mycoses, which is a consequence of widespread use of immunosuppressive drugs used in transplants, cytotoxic chemotherapy in cancer treatments, broad spectrum antibiotics, recurring mycotic infections in those suffering of AIDS, and a recent hazard of previously agricultural niche saprophyte fungi that are becoming etiological agents and are relatively resistant to conventional therapies.'

nrakta Europe, including Britain, south and east to N. Africa, the Atlantic Islands and W. Asia. ksacta Grassy places and roadsides[17], often occurring as a garden weed on acid and calcareous soils[1].

propta Pre-soak the seed for 12 hours in warm water and then sow in spring in situ[200]. The seed can also be sown in situ in autumn. Green manure crops can be sown in situ from early spring until early autumn[87]. (the later sowings are for an over-wintering crop)

nwatta Dislikes acid soils[87]. (This conflicts with the notes on its habitat above.) Dislikes shade. A good food plant for many caterpillars[30]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is suckering with new plants from runners away from the plant [2-1].

5.1.23 Vicia hirsuta

Hairy Tare, Tiny vetch

tfo2n 4 tlin 9 cyuc 2 kcak 3 tcan 0 dwat 0.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta Vicia hirsuta is a ANNUAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to August, and the seeds ripen from July to September. The species is hermaphrodite (has

htut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Artemisia vestita is a PERENNIAL growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from August to October, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista Although no reports of toxicity have been seen for this species, skin contact with some members of this genus can cause dermatitis or other allergic reactions in some people[222].

dwatta Antiphlogistic FebrifugeThe plant is antiphlogistic and febrifuge[266].

nrakta E. Asia from Pakistan to China and Tibet. ksacta Hills, rocky slopes, grasslands, shrublands and outer forest margins at elevations of 2000 - 4300 metres[266].

propta Seed - surface sow from late winter to early summer in a greenhouse, making sure that the compost does not dry out[200]. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant out in late spring or early summer. Division in spring or autumn[200]. Basal cuttings in late spring. Harvest the young shoots when about 10 - 15cm long, pot up in a lightly shaded position in a greenhouse or cold frame and plant them out when well rooted. Very easy.

nwatta Easily grown in a well-drained circumneutral or slightly alkaline loamy soil, preferring a warm sunny dry position[1, 200]. Established plants are drought tolerant[200]. Plants are longer lived, more hardy and more aromatic when they are grown in a poor dry soil[245]. This species is closely related to *A. sacrorum* and *A. gmelinii*, it is often confused with those species[266]. We are not sure if this plant is annual, biennial or perennial, since various reports differ. Members of this genus are rarely if ever troubled by browsing deer[233].

4.2.262 Diervilla lonicera

Bush Honeysuckle, Northern bush honeysuckle

3 tlin 8 cyuc 0 kcak 0 tcan 2 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Diervilla lonicera is a deciduous Shrub growing to 1 m (3ft 3in) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

tcanta Soil stabilizationThe plants stoloniferous habit makes it useful for soil stabilization on banks and slopes[200].

dwatta Diuretic Galactagogue Laxative Narcotic OphthalmicThe leaves are diuretic[257]. A compound decoction has been used in the treatment of stomach aches[257]. This contrasts with a report that the leaves contain a narcotic principle, inducing nausea[207]. The plant is used as a gargle in catarrhal angina[207]. The root is diuretic, galactagogue, laxative and ophthalmic[257]. A cooled infusion has been used as an eyewash for sore eyes[257]. The bark is laxative and ophthalmic[257]. An infusion has been used to increase milk flow in a nursing mother and as an eyewash for sore eyes[257].

nrakta Eastern N. America - Newfoundland to Florida. ksacta Dry gravelly soils[200] in woodlands[235].

propta Seed - we have no information on this species but suggest sowing the seed in a cold frame as soon as it is ripe if possible, otherwise in late winter or early spring. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division of suckers in the spring[200]. Cuttings of

half-ripe wood, July/August in a frame[188]. Cuttings of mature wood, late autumn in a frame[188].

nwatta Landscape Uses:Border, Container, Ground cover, Massing, Rock Garden, Woodland garden. Succeeds in a moist fertile well-drained soil and is not fussy as to soil type[200]. Succeeds in full sun or partial shade[188]. Plants are hardy to about -30°C[200]. This species is a spreading suckering plant[11], it makes a useful understory planting in woodlands[200]. Any pruning can be carried out in the winter or after flowering[188]. 2 or 3 year old stems can be removed in order to promote a more shapely bush[188]. Flowers are produced on the current seasons growth[11]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: North American native, Attractive flowers or blooms.

4.2.263 Lobelia cardinalis

Cardinal Flower

3 tlin 9 cyuc 0 kcak 0 tcan 3 dwat 1 m hkuc hmimhtut cyutli tucpha7nhs6s hwicli hrasjlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Lobelia cardinalis is a PERENNIAL growing to 1 m (3ft 3in) by 0.3 m (1ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can grow in water.

pcista The plant is potentially toxic, but the degree of toxicity is unknown[222]. It contains the alkaloid lobeline which has a similar effect upon the nervous system as nicotine[274]. he sap of the plant has been known to cause skin irritation[274].

dwatta Analgesic Anthelmintic Antispasmodic Emetic Epilepsy Expectorant Febrifuge Homeopathy Nerve StomachicEmetic, expectorant and nerve[4, 61]. The root is analgesic, anthelmintic, antispasmodic and stomachic[4, 61, 257]. A tea made from the roots has been used in the treatment of epilepsy, syphilis, typhoid, stomach aches, cramps, worms etc[222, 257]. A poultice of the roots has been applied to sores that are hard to heal[257]. The leaves are analgesic and febrifuge[257]. A tea made from the leaves is used in the treatment of croup, nosebleeds, colds, fevers, headaches etc[222]. A poultice of the leaves has been applied to the head to relieve the pain of headaches[257]. This species is considered to have similar medicinal activity to *L. inflata*, but in a milder form[222]. It was seldom if ever used[222]. The plant is used to make a homeopathic remedy[4]. The report does not say which part of the plant is used, nor what it treats.

nrakta N. America - New Brunswick to Quebec, south to Florida and Texas. ksacta Damp shores, meadows and swamps[43].

propta Seed - best sown as soon as it is ripe in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring[200]. Basal cuttings in spring[1]. Harvest the shoots when they are about 10cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer. Layering in moist sand, it forms roots at the nodes[200].

nwatta Landscape Uses:Border, Container, Massing, Specimen, Woodland garden. Requires a deep rich soil and plenty of moisture[1, 200]. Grows well in heavy clay soils. Succeeds in standing water though is not then so long lived[200]. Succeeds in full sun or light shade[200]. Requires protection from the wind[200]. Dormant plants are hardy to at least -25°C[187], though they can be excited into premature growth in mild winter areas and are then more susceptible to frost damage[200]. A very ornamental plant[1]. Hybridizes freely with other members of this genus. Special Features:Attracts birds, North American native, Naturalizing, All or parts of this plant are poisonous, Wetlands

plant, Attracts butterflies, Suitable for cut flowers, Attractive flowers or blooms. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2].

4.2.264 *Fritillaria meleagris*

Snakehead Fritillary, Chequered lily, Checkered Fritillary
3 tlin 7 cyuc 0 kcak 0 tcan 1 dwat m hkuc
hmimhtut cyutli tcup hwicli hrsajlutnyik hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta *Fritillaria meleagris* is a BULB growing to 0.3 m (1ft) by 0.1 m (0ft 4in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from April to May, and the seeds ripen from June to July. The species is hermaphrodite (has both male and female organs) and is self-fertile. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The bulb is poisonous[100].
dwatta The plant formerly had a reputation as a healing herb, but is not used at present[4].

nrakta Europe, including Britain, from Sweden south and west to France, Serbia and the Lower Volga. ksacta Damp meadows and pastures[17], especially on alkaline soils[90].

propta Seed - best sown as soon as ripe in a cold frame, it should germinate in the spring[1]. Protect from frost[134]. Stored seed should be sown as soon as possible and can take a year or more to germinate[134]. Sow the seed quite thinly to avoid the need to prick out the seedlings. Once they have germinated, give them an occasional liquid feed to ensure that they do not suffer mineral deficiency. Once they die down at the end of their second growing season, divide up the small bulbs, planting 2 - 3 to an 8cm deep pot. Grow them on for at least another year in light shade in the greenhouse before planting them out whilst dormant. Division of offsets in August[1]. The larger bulbs can be planted out direct into their permanent positions, but it is best to pot up the smaller bulbs and grow them on in a cold frame for a year before planting them out in the autumn. Bulb scales[163].

nwatta Landscape Uses:Border, Container, Massing, Specimen, Woodland garden. Prefers a moist non-acid soil and a sunny position[17, 24, 42]. Succeeds in any soil, preferring a light soil with plenty of humus[1, 90]. Succeeds in sun or light shade[1, 90]. Grows well in short turf[108]. A very ornamental plant[1], it often self-sows when in a suitable position. Rabbits are very fond of this plant and will destroy it wholesale if given the opportunity[4]. A good plant for the spring meadow[24, 90, 134]. The flowers are very attractive to bees[108]. Plants should not be allowed to dry out in the summer[90]. Special Features: Attractive foliage, Naturalizing, Flowers have an unpleasant odor, Attractive flowers or blooms.

4.2.265 *Aster puniceus*

Purplestem Aster
3 tlin 8 cyuc 0 kcak 2 tcan 2 dwat 1.3 m hkuc
hmimhtut cyutli tcup hwicli hyishrsajlutnyik hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta *Aster puniceus* is a PERENNIAL growing to 1.3 m (4ft 3in) by 1 m (3ft 3in). See above for USDA hardiness. It

is hardy to UK zone 3. It is in flower from September to October. The species is hermaphrodite (has both male and female organs) and is self-fertile. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

tcanta Landscape uses: Forest garden, Cottage gardens, Water garden, Wildlife garden, Moist Prairie or Meadow, Perennial borders. Attracts wildlife: Butterfly nectar plant, Butterfly host plants.

dwatta The roots are diaphoretic, emmenagogue and febrifuge[257]. A decoction has been used in the treatment of colds, consumption, typhoid, pneumonia and fevers[257]. A decoction has been used to promote menstruation - this can lead to an abortion[257]. The decoction has also been used to restore a woman to health after giving birth[257]. The chewed root has been applied to an aching tooth to allay the pain[257].

nrakta Eastern N. America. Naturalized in several sites in northern Britain[17]. ksacta Not known

propta Seed - surface sow in spring in a cold frame. Do not allow the compost to become dry. Pre-chilling the seed for two weeks can improve germination rates[134]. Germination usually takes place within 2 weeks at 20°C[134]. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn[200]. Very easy, larger divisions can be planted straight into their permanent positions whilst smaller clumps are best potted up and kept in a cold frame until they are growing away well. Basal cuttings in late spring. Harvest the shoots when they are about 10 - 15cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Succeeds in most good garden soils[1], preferring one that is well-drained and moisture retentive[200]. Prefers a sunny position[200], but it also succeeds in partial shade[233]. Prefers a rich soil[1], but tolerates poor ones[233]. Plants are hardy to about -25°C[187]. The crushed plant has a smell like juniper berries[257]. Hybridizes freely with other members of this genus[200]. Plants need to be divided every few years, preferably in the spring, in order to keep the plant vigorous[187]. Most species in this genus seem to be immune to the predations of rabbits[233]. Attracts butterflies and moths, it is also a good bee plant providing nectar in autumn[30].

4.2.266 *Chelone glabra*

Balmory, White turtlehead
3 tlin 7 cyuc 0 kcak 0 tcan 3 dwat 1 m hkuc
hmimhtut cyutli tcuphja7n hwicli hrsajlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Chelone glabra* is a PERENNIAL growing to 1 m (3ft 3in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

dwatta Antibilious Aperient Appetizer Cathartic Cholagogue Detergent Tonic VermifugeBalmory is a very bitter herb with a tea-like flavour that acts mainly as a tonic for the liver and digestive system[238]. It has long been held in esteem in N. American folk medicine, though it has never been investigated scientifically[268]. The herb also has anti-depressant and laxative effects[238]. A decoction of the whole herb is antibilious, aperient, appetizer, cathartic, cholagogue, detergent, tonic, vermifuge[4, 21, 46, 61, 165, 207, 222]. It is used internally in the treatment of consumption, debility, diseases of the liver, gallbladder problems, gallstones etc[4, 254]. It is also used to relieve nausea and vomiting, intestinal colic and to expel worms[254]. Its tonic effect upon the digestive system has made it of benefit in the treatment of anorexia nervosa[268]. Externally, it is applied as a soothing ointment to piles, inflamed tumours, irritable

Emetic Emollient Epilepsy Febrifuge Hypotensive Purgative Skin Styptic TonicThis species is commonly used in Chinese medicine and is considered to be one of the 50 fundamental herbs[218]. It came second in a study of 250 potential antifertility agents[218]. Diuretic, emollient, febrifuge, tonic[11, 147, 174, 178]. The flowers and flower buds are antibacterial, anticholesterolemic, anti-inflammatory, antispasmodic, haemostatic and hypotensive[11, 147, 174, 176, 178, 218, 238, 279]. The ovaries, especially just before the plant flowers, are a rich source of rutin and this is a valuable hypotensive agent[218]. The buds, flowers and pods are concocted and used in the treatment of a variety of ailments[218] including internal haemorrhages, poor peripheral circulation, internal worms etc[238]. This remedy should not be prescribed for pregnant women[238]. The seedpods are abortifacient[218]. The seed is emetic and haemostatic[218]. It is used in the treatment of haemorrhoids, haematuria, uterine bleeding, constipation, stuffy sensation in the chest, dizziness, red eyes, headache and hypertension[176].It should be used with caution since it is toxic[218]. The leaves are laxative[218]. They are used in the treatment of epilepsy and convulsions[218]. A decoction of the stems is used in the treatment of piles, sore eyes and skin problems[218].

nrakta E. Asia - N. China, Japan, Korea. ksacta Open country between 300 and 1000 metres in W. China[109].

propta Seed - best sown as soon as it is ripe in a greenhouse[200]. Pre-soak stored seed for 12 hours in hot (not boiling) water and sow in late winter in a greenhouse[78]. Prick out the seedlings as soon as they are large enough to handle into individual pots in the greenhouse, and grow them on for 2 years under protected conditions. Plant them out into their permanent positions in early summer of their third year. Cuttings of young shoots with a heel, July/August in a frame[11]. Air-layering[200].

nwatta Landscape Uses:Firewood, Pest tolerant, Specimen, Street tree. Succeeds in a well-drained moderately fertile soil in full sun[200]. Tolerates poor soils, atmospheric pollution, heat and, once established, drought[200]. Hardy to about -25° when mature, but it can be damaged by severe frosts when it is young[200]. A very ornamental[1] and fast growing tree[200], it grows best in hot summers[188]. It grows best in the warmer areas of the country where the wood will be more readily ripened and better able to withstand winter cold[219]. Trees take 30 years to come into flower from seed.[200], but they do not often ripen their seed in Britain[11]. Cultivated in China for the rutin contained in its leaves and ovaries[218]. Plants should be container-grown and planted out whilst young, older plants do not transplant well[219]. Plants in this genus are notably resistant to honey fungus[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. Special Features: Not North American native, Attractive flowers or blooms. The plant is heat tolerant in zones 9 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2].

5.1.19 *Galega officinalis*

Goat's Rue, Professor-weed
tfo2n 4 tlin 8 cyuc 2 kcak 0 tcan 3 dwat 1.2 m hkuc
hmimhtut cyutli tcup hwicli hyishrsajlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Galega officinalis* is a PERENNIAL growing to 1.2 m (4ft) by 0.8 m (2ft 7in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from June to July, and the seeds ripen in August. The species

is hermaphrodite (has both male and female organs) and is self-fertile. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista A few reports exist, none of them in Britain, of toxicity to mammals[76], though the plant is often fed to cows and goats in order to increase their milk yield[238].

kcakta Edible Parts: LeavesEdible Uses: Curdling agentLeaves - cooked[2]. Used like spinach[177, 183]. Some caution is advised due to reports of possible toxicity. The herb is used as a substitute for rennet in curdling plant milks etc[183].

tcanta Cosmetic Green manureA fast-growing plant, it makes a good green manure crop, enriching the soil with organic matter and also fixing atmospheric nitrogen[7]. The plant is used cosmetically in hand and foot baths[7].

dwatta Diaphoretic Diuretic Galactagogue HypoglycaemicGoat's rue was once important in the treatment of plague, fevers and infectious diseases[238]. It is still used in modern herbalism, though mainly for its effect in promoting milk-flow in lactating mothers (it has been shown to increase the flow of milk in cows and goats by 35 - 50%[4, 7, 238]) and for its positive effect on the digestive system[238]. The plant contains galegine, an alkaloid that strongly reduces blood sugar levels which make it useful in the treatment of diabetes[254]. The leaves and flowering tops are diaphoretic, diuretic, galactagogue and hypoglycaemic[4, 7, 21, 165]. It has also been used in the treatment of fevers[4, 7]. It is taken internally to treat insufficient lactation, late-onset diabetes, pancreatitis and digestive problems, especially chronic constipation caused by a lack of digestive enzymes[238]. The plant is harvested as it is just coming into flower and is dried for later use[4]. Some caution is advised, see notes above on toxicity.

nrakta S. Europe to W. Asia. Naturalized in S. Britain. ksacta Scrub, woods, marshy fields and roadsides[187].

propta Seed - pre-soak for 12 hours in warm water and then sow the seed in spring or autumn in a cold frame[111, 200]. Spring-sown seed can be slow to germinate, a period of cold stratification may improve the germination time. When they are large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in the summer. If you have sufficient seed, then it is possible to sow outdoors in situ in mid to late spring. Division in spring or autumn[111]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Succeeds in most soils but repays generous treatment[1, 200]. Prefers full sun and a deep moist soil[1, 4] but it also succeeds in light shade[200]. Grows well even in poor soils[233]. Plants are very tolerant of neglect and can be grown in quite coarse grass, which can be cut annually in the autumn[233, 238]. A long-lived plant[1], it can be invasive in good growing conditions[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

5.1.20 *Vicia americana*

American Vetch, Mat vetch
tfo2n 4 tlin 7 cyuc 2 kcak 4 tcan 1 dwat 1 m hkuc
hmimhtut cyutli tcup hwicli hrsajlutnyik hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta *Vicia americana* is a PERENNIAL growing to 1 m (3ft 3in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in July. The species is hermaphrodite (has both male and female organs) and is self-fertile. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves Seed Seedpod ShootsEdible Uses: Young shoots - cooked[105, 155, 161]. The tender seeds are eaten by the N. American Indians[212]. Both the

savoury dish in any of the ways that cooked beans are used, they can also be roasted or ground into a powder. If the seed is bitter this is due to the presence of toxic alkaloids and the seed should be thoroughly leached before being cooked[2, 105]. Root - raw or cooked[256, 257]. Peeled and then eaten raw or boiled[257]. The roots are harvested in the spring and are then roasted before being eaten[256]. The roasted root can be dried, ground into a flour and then stored for later use. The raw root should not be eaten since they contain toxic alkaloids and will cause a drunken-like state if eaten in excess, but the cooked root is safe to eat[256, 257]. Seed-pods - cooked[105].

tcanta Ornamental. Nitrogen fixer. Dynamic accumulator.

nrakta North-western N. America to N. Asia. Naturalized in Britain. ksacta Roadsides and open banks[43]. Shingle banks in rivers in Scotland[187].

propta Pre-soak the seed for 24 hours in warm water and then sow in early spring in a greenhouse. Germination should take place within a couple of weeks. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in early summer. It should also be possible to sow the seed outdoors in situ in the middle of spring. It might be necessary to protect this sowing from mice. Division in early March[1]. Difficult. Basal cuttings in April[1]. Harvest the shoots when they are about 10cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta An easily grown plant, succeeding in any moderately good soil in a sunny position[200]. This species is very susceptible to slug damage, the plant has been cultivated as an ornamental, but has virtually died out in the garden though it grows well in the wild in Scotland[187]. Closely related to *L. perennis*[200] and possibly no more than a subspecies of it[50], the uses listed below are for *L. perennis* but it is assumed that they also apply to this species[K]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

5.1.16 Hedysarum alpinum

Alpine Sweetvetch

tfo2n 4 tin 8 cyuc 3 kcaok 0 tcan 0 dwat 0.6 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprklwis hpa7tmwatli xre7t hjonli

drutta Hedysarum alpinum is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in June, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista Please read The New Yorker link in the Reader Comments below

kcakta Edible Parts: RootEdible Uses: Root - raw or cooked[61, 177]. A carrot-like flavour[105]. The root can be harvested from autumn until spring, it tastes best after some frosts[172]. Possibly toxic. ** Please read The New Yorker link in the Reader Comments below

nrakta N. America. to N. Asia. ksacta Calcareous rocks and gravelly soils, north to Alaska[43]. Swampy meadows and swamps in China[266].

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

nwatta Easily grown in ordinary garden soil in a sunny position, preferring a deep well-drained sandy loam[1, 200]. Plants strongly resent root disturbance and should be placed in their permanent positions as soon as possible[1]. The var. *H. alpinum americanum*. Michx. is used for food[61, 177].

This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

5.1.17 Hedysarum hedysaroides

Alpine French Honeysuckle

tfo2n 4 tin 8 cyuc 3 kcaok 0 tcan 0 dwat 0.4 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprklwis hpa7tmwatli xre7t hjonli

drutta Hedysarum hedysaroides is a PERENNIAL growing to 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 4. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Root - raw or cooked. Sweet and highly nutritious. Harvested from late autumn to spring, it is sweetened by frost[172].

nrakta S. and C. Europe, Arctic Russia and Western N. America. ksacta Gravel river bars, roadsides, rocky hills and meadows, 1200 - 2500 metres in the Alps[172, 187].

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

nwatta Easily grown in ordinary garden soil that is moist in summer[187] and a sunny position[1], preferring a deep well-drained sandy loam[1, 200]. This species is hardy to about -20°C[187]. Plants strongly resent root disturbance and should be placed in their permanent positions as soon as possible[1]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

5.1.18 Sophora japonica

Japanese Pagoda Tree, Scholar Tree

tfo2n 4 tin 9 cyuc 2 kcaok 2 tcan 3 dwat 20 m hkuc htut cyutli hgattcup hwicli hyishrasjlutnyik hpa7tli flatprklwis hpa7tmwatli xre7t hjonli

drutta Sophora japonica is a deciduous Tree growing to 20 m (65ft) by 20 m (65ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in September, and the seeds ripen in November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil and can tolerate drought. It can tolerate atmospheric pollution.

pcista The plant contains cytosine, which resembles nicotine and is similarly toxic[238].

kcakta Edible Parts: Flowers LeavesEdible Uses: Rutin TeaYoung leaves and flowers - cooked[177, 183]. The leaves need to be cooked in three lots of water in order to remove the bitterness[179]. This will also remove most of the vitamins and minerals[K]. The leaves are a rich source of rutin, they contain much more than the usual commercial source, buckwheat (*Fagopyrum esculentum*)[174]. The ovaries, before the flowers open, contain up to 40% rutin[218]. A tea can be made from the young leaves and flowers[183]. An edible starch is obtained from the seed[183].

tcanta Dye WoodA yellow dye is obtained from the seed-pods and the flowers[46, 61, 109, 178]. It is green when mixed with indigo[151]. Wood - tough, light, strong, of superior quality. Used in carpentry[109, 174].

dwatta Abortifacient Antibacterial Anticholesterolemic Antidiarrhoeal Antiinflammatory Antispasmodic Diuretic

ulcers, inflamed breasts etc[4, 268]. The plant is harvested when in flower and is dried for later use[238].

nrakta Eastern N. America - Newfoundland to Ontario and Minnesota, south to Georgia and Missouri. ksacta Margins of swamps, wet woods and rivers[4, 43].

propta Seed - sow spring in a cold frame and keep moist. The seed germinates in 2 - 6 weeks at 20°C[164]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the cold frame. Plant them out into their permanent positions in the spring or early summer. Division in autumn[1]. Cuttings of soft tips in summer in a sandy soil in a frame[200].

nwatta Easily grown in any ordinary soil, but it grows best in a light loam[1]. Tolerates heavy clays and light shade[1, 200]. Prefers growing in light shade[238]. Survives but does not thrive in dry conditions[200]. Prefers growing in a bog garden or in a soil that is unlikely to dry out[200]. Plants are very cold-hardy, tolerating temperatures down to about -20°C[187]. A polymorphic species, there are several named forms[43]. The plant spreads freely at the roots and so is best grown in a large pot[4].

4.2.267 Verbascum pulverulentum

Hoary Mullein, Broad-leaf mullein

3 tin 7 cyuc 0 kcaok 2 tcan 1 dwat 1.8 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatprklwisslip hpa7tmwatli fyfixre7t hjonli

drutta Verbascum pulverulentum is a BIENNIAL growing to 1.8 m (6ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil.

pcista The leaves contain rotenone and coumarin, though the quantities are not given[222]. Rotenone is used as an insecticide and coumarin can prevent the blood from clotting[K]. Hairs on the leaves can act as an irritant[222].

tcanta Dynamic accumulator.

dwatta VermifugeThe plant (seeds?) are used to rid the body of tapeworms[4].

nrakta Europe, including Britain, from the Netherlands north and east to Spain, Switzerland, Greece. ksacta A rare native along roadsides in Norfolk and Suffolk, a rare casual elsewhere[17].

propta Seed - sow late spring to early summer in a cold frame and only just cover the seed[200]. Germination usually takes place within 2 - 3 weeks. When they are large enough to handle, prick out the seedlings into individual pots and plant them out in late summer. The seed has a long viability[200].

nwatta Succeeds in most well-drained soils, including dry ones, and prefers a sunny position[200]. Dislikes shade and wet soils[200]. Thrives on chalk[200]. Prefers a light soil[200]. Hybridizes with other members of this genus, though the progeny are usually sterile[200].

4.2.268 Solidago rigida

Stiff Goldenrod, Flat Topped Goldenrod, Stiff Goldenrod

3 tin 9 cyuc 0 kcaok 0 tcan 2 dwat 1.2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprklwis hpa7tmwatli xre7t hjonli

drutta Solidago rigida is a PERENNIAL growing to 1.2 m (4ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

tcanta Dye LatexA good quality rubber can be made from a latex that is obtained from the leaves[46, 61]. Mustard, orange and brown dyes can be obtained from the whole plant[168].

dwatta Antiseptic Astringent Cathartic Diuretic Stings StypticThe leaves and blossoms are antiseptic, astringent and styptic[4, 168]. A valuable remedy in the treatment of all kinds of haemorrhages[4]. The flowers have been ground into a lotion and used to treat bee stings[213, 257]. An oil obtained from the plant (is this an essential oil?) is diuretic[4]. The root is cathartic and diuretic[257]. A decoction of the root has been used as an enema[257]. An infusion has been used to restore the flow of urine[257].

nrakta Eastern N. America - Ontario to Saskatchewan, south to Massachusetts, Georgia, Texas and Colorado. ksacta Dry or gravelly open woods, thickets and prairies[43].

propta Seed - sow spring in a cold frame. Only just cover the seed and do not allow the compost to become dry. Prick out the seedlings into individual pots when they are large enough to handle, and grow them on for their first winter in pots. Plant them out into their permanent positions in spring or early summer. Division in spring or autumn. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Landscape Uses:Border. Succeeds in any moderately fertile moisture retentive soil in sun or semi-shade[200]. Grows well in heavy clay soils. A rather greedy plant, it is apt to impoverish the soil[1]. The plant attracts various beneficial insects such as ladybirds, lacewings and hoverflies to the garden, these insects will help to control insect pests in the garden[201, 238]. Special Features: Attractive foliage, North American native, Invasive, Naturalizing, Attracts butterflies, Suitable for cut flowers, Suitable for dried flowers, Attractive flowers or blooms.

4.2.269 Euphorbia esula

Leafy Spurge. Green spurge

3 tin 9 cyuc 0 kcaok 4 tcan 0 dwat 1 m hkuc hmimhtut cyutli hgatkuyctcup hwicli hyishrasjlutnyik hpa7tli flatprklwis hpa7tmwatli hjonli

drutta Euphorbia esula is a PERENNIAL growing to 1 m (3ft 3in) by 0.4 m (1ft 4in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

pcista The sap contains a latex which is toxic on ingestion and highly irritant externally, causing photosensitive skin reactions and severe inflammation, especially on contact with eyes or open cuts. The toxicity can remain high even in dried plant material[200]. Prolonged and regular contact with the sap is inadvisable because of its carcinogenic nature[214].

tcanta Euphorbia esula has nutrient value similar to alfalfa (*Medicago sativa* L.) and crested wheatgrass (*Agropyron cristatum* (L.) Gaertn.) and provides nutritious forage for sheep and goats. Potential as a whole-plant biomass as a locally grown fuel crop for home-heating purposes (Maxwell et al., 1985). A high protein feed stock for grazing sheep and goats (Fox et al., 1991; Sedivec et al., 1995). The high protein diet result in very high quality mohair in angora goats (Stoneberg, 1989). High in hydrocarbon latex - possibly a good cold-hardy hydrocarbon species. Leafy spurge hay burns with 4x the energy of wheat straw [1-1]. Dynamic accumulator.

nrakta Eurasia. Native to central and southern Europe, and eastward through most of Asia north of the Himalaya to Korea and eastern Siberia. Currently found worldwide with the exception of Australia and New Zealand. ksacta Found on prairies, savannas, mountain meadows, and near woodland. It grows in fields and waste places.

propta It can grow from seed or from creeping roots. Reproduces readily like by seeds that have a high germination rate and may remain viable in the soil for at least eight years.

nwatta Experimental Crop Management: HayClimate: boreal to subtropical. Humidity: arid to humid. Prefers areas of full sunlight and dry soil but can tolerate a variety of habitats including temperatures as low as -45C (-49F). A deep-

rooted perennial plant. Roots grow twice as fast in sandy soil as in clay soil. Roots in clay soil have greater branching than those in sandy soil. High levels of soil nitrogen can reduce the biomass of leafy spurge roots and lead to greater root concentrations near the top of the soil profile (U.S. Forest Service). Especially aggressive in semi-arid situations. Adapted to a wide range of conditions, from moist to dry with annual rainfalls as low as 180mm (7"). It grows as clusters with upright stems, 0.3 to 1m tall. Cultivation: experimental. Management: hay (Describes the non-destructive management systems that are used in cultivation) [1-1].

4.2.270 *Helenium autumnale*

Sneezeweed, Common sneezeweed, Fall sneezeweed, Mountain sneezeweed, False Sunflower
3 tlin 8 cyuc 0 kcaak 0 tcan 2 dwat 1.8 m hkuc
htuc cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Helenium autumnale* is a PERENNIAL growing to 1.8 m (6ft) by 0.5 m (1ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista The plant is poisonous to ruminants[222]. Contact with the plant might cause dermatitis in sensitive people[222].

tcanta InsecticideThe plant contains helenalin, a compound that has insecticidal properties, though it is also toxic to fish and worms[222].

dwatta Alternative Cancer Laxative SternutatoryThe dried nearly mature flower heads are used in a powdered form as a snuff to treat colds and headaches[207, 222, 257]. When made into a tea they are used in the treatment of intestinal worms[222]. The powdered leaves are sternutatory[222, 257]. An infusion of the leaves is laxative and alterative[207]. An infusion of the stems has been used as a wash in the treatment of fevers[257]. The plant contains helenalin, a compound that has shown significant anti-tumour activity[222].

nrakta Eastern N. America - Quebec to Florida, west to Manitoba and Arizona. ksacta Wet meadows and marshes[187]. Rich thickets, meadows and shores[43]. Low, moist calcareous soils in Texas[274].

propta Seed - sow spring in a greenhouse. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. If you have sufficient seed it might be worthwhile trying a sowing in mid to late spring in situ outdoors[111]. Cuttings of soft wood from the base of the plant, June/July in a frame. Basal cuttings in spring[200]. Harvest the shoots when they are about 10 - 15cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer. Division in spring or autumn[111]. This needs to be done fairly regularly because the clumps soon become congested[233]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Landscape Uses:Border, Container, Foundation, Massing, Seashore. Grows well in ordinary garden soil[1, 111], succeeding in most conditions other than boggy soils[233]. It prefers a fertile moisture retentive soil[200] in a sunny position[108, 111]. Dislikes dry soil[200]. Plants seem to be immune to the predations of rabbits[233]. A good bee and butterfly plant[30]. A very ornamental plant[1], some named forms have been selected for their ornamental value[187]. Special Features: North American native, Naturalizing, All or parts of this plant are poisonous, Wetlands plant, Attracts butterflies, Suitable for cut flowers, Suitable for dried flowers.

4.2.271 *Solanum carolinense*

Horse Nettle, Carolina horsenettle
3 tlin 7 cyuc 0 kcaak 0 tcan 2 dwat 1 m hkuc
hmmhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Solanum carolinense* is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All parts of the plant are potentially poisonous[222]. Fatalities have been reported with children[222].

tcanta InsecticideThe leaves have been used as an insecticide[257].

dwatta Anodyne Antispasmodic Aphrodisiac Diuretic Epilepsy PoulticeThis plant should be used with caution, see the notes above on toxicity. The berries and the root are anodyne, antispasmodic, aphrodisiac and diuretic[4, 222]. They have been used in the treatment of epilepsy[207, 222]. They have been recommended in the treatment of asthma, bronchitis and other convulsive disorders[4, 207]. The berries should be harvested when fully ripe and carefully air-dried[4]. An infusion of the seeds has been gargled as a treatment for sore throats and drunk in the treatment of goitre[257]. A tea made from the wilted leaves has been gargled in the treatment of sore throats and the tea has been drunk in the treatment of worms[222, 257]. A poultice made from the leaves has been applied to poison ivy rash[222].

nrakta South-eastern N. America - New England to Florida, west to Texas and South Dakota. ksacta Dry fields and waste ground, usually in sandy soils[4, 222, 235].

propta Seed - sow early spring in a warm greenhouse. When they are large enough to handle, prick the seedlings out into individual pots and plant them out after the last expected frosts.

nwatta Succeeds in most soils[1].

4.2.272 *Aconitum carmichaelii*

Japanese Aconite, Carmichael's monkshood
3 tlin 7 cyuc 0 kcaak 0 tcan 2 dwat 1.5 m hkuc
hmmhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Aconitum carmichaelii* is a PERENNIAL growing to 1.5 m (5ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The whole plant is highly toxic - simple skin contact has caused numbness in some people[1, 238].

dwatta Anaesthetic Analgesic Antiinflammatory Antirheumatic Cardiotonic VasodilatorA widely used herbal remedy in China, where it is cultivated for its root[218]. This is harvested in the autumn as the plant dies down and is then dried before being used. The root is anaesthetic, analgesic, anti-inflammatory, antirheumatic, cardiotonic, stimulant and vasodilator[176, 218, 238]. It is used in the treatment of shock and collapse, chronic diseases with symptoms of cold, gastralgia and rheumatic arthralgia, oedema and diarrhoea due to hypofunction of the spleen and kidney[176]. A tincture of the root is used externally in the treatment of rheumatism, arthralgis, sprains, contusions etc[283]. Use with great caution, the plant contains the toxic alkaloid aconitine and is very poisonous - should not be used internally[218] unless under the direction of a qualified practitioner[238, 283]. Overdoses lead to numbness of the tongue, lips and extremities, nausea, vomiting, irritability and coma[176].

nrakta E. Asia - C. and W. China to N. America. ksacta Forest margins, scrub, grassy slopes and mountains at elevations of 100 - 2200 metres[266].

propta Seed - best sown as soon as it is ripe in a cold frame[111]. The seed can be stratified and sown in spring

there are no recorded cases of poisoning by this plant in Britain[76].

kcakta Edible Parts: Leaves SeedEdible Uses: TeaSeed - cooked[22, 74]. Not very palatable nor very digestible but it is very nutritious[2, 115]. The seed can be dried, ground into a powder and mixed with cereal flour to make bread, biscuits, cakes etc[183]. The beans compliment the protein in the cereal making it more complete[K]. Some caution is advised, see the notes above on toxicity. Leaves, young shoots and young pods - cooked[105, 177, 183]. The leaves are a tea substitute[183].

tcanta Green manureA very valuable green manure crop, it can be sown in spring or as late as October. A deep rooted and fast growing plant, it is winter hardy, an effective weed suppresser, produces a good bulk and fixes a large amount of nitrogen[87]. Dynamic accumulator.

nrakta Europe, including Britain, from Scandinavia south and east to N. Africa and W. Asia. ksacta Hedges and grassy places, avoiding acid soils or shady positions[17].

propta Pre-soak the seed for 24 hours in warm water and sow in situ from late winter to early summer and again in the autumn.

nwatta Succeeds in any well-drained soil in a sunny position if the soil is reliably moist throughout the growing season, otherwise it is best grown in semi-shade[200]. The subspecies *V. sativa leucosperma*. Ser. is the form usually grown for food[74]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

5.1.14 *Trifolium repens*

White Clover, Dutch Clover, Purple Dutch Clover, Shamrock, White Clover

tfo2n 4 tlin 8 cyuc 3 kcaak 4 tcan 2 dwat 0.1 m hkuc
htuc cyutli tcup hwicli hysihrasjlutnyikfrip hpa7tli flatprikliwissip hpa7tmwatli xre7t hjonli

drutta *Trifolium repens* is an evergreen Perennial growing to 0.1 m (0ft 4in) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in leaf all year, in flower from June to September, and the seeds ripen from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers moist soil.

pcista This plant has been known to cause problems for grazing animals, though this has never happened in Britain[76]. The problem may be associated with the climate in which the plant is growing[76]. The species is polymorphic for cyanogenic glycosides[218]. The leaves and flowers of certain cyanogenic phenotypes contain a glycoside which releases cyanide on contact with the enzyme linamarase[218].

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Condiment TeaLeaves - raw or cooked as a potherb[13, 94, 183]. The young leaves are harvested before the plant comes into flower and are used in salads, soups etc[9]. They can also be used as a vegetable, cooked like spinach[9]. The leaves are best cooked[172]. Flowers and seed pods are dried, ground into powder and used as a flour or sprinkled on cooked foods such as boiled rice[183]. Very wholesome and nutritious[115]. The young flowers can also be used in salads[144, 172, 183]. Root - cooked[172, 177]. The dried leaves impart a vanilla flavour to cakes etc[172]. Dried flowering heads are a tea substitute.

tcanta Fodder Green manureThe plant makes a good green manure, it is useful for over-wintering, especially in a mixture with *Lolium perenne*[87]. Produces a good bulk. It is a host to 'clover rot' however, so should not be used too frequently[87]. It can be undersown with cereals or with tomatoes in a greenhouse (sow the seed before planting the tomatoes)[87]. Fairly deep rooting but not very fast growing[87]. A good fast ground-cover plant for a sunny position[87]. Nectary. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Antirheumatic Antiscrophulatic Depurative Detergent Ophthalmic TonicThe plant is antirheumatic, antiscrophulatic, depurative, detergent and tonic[218]. An infusion has been used in the treatment of coughs, colds, fevers and leucorrhoea[257]. A tincture of the leaves is applied as an ointment to gout[218]. An infusion of the flowers has been used as an eyewash[257].

nrakta Europe, including Britain, from Norwat south and east to N. Africa, north and western Asia. ksacta Grassland and lawns, preferring a calcareous clay soil[9, 17].

propta Pre-soak the seed for 12 hours in warm water and then sow in spring in situ. If the seed is in short supply it might be better to sow it in pots in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in late spring. Division in spring[238].

nwatta Agroforestry Services: Nitrogen Agroforestry Services: Understorey legume Fodder: Pasture Global Crop Management: Fodder Management: Hay Staple Crop: ProteinLandscape Uses: Ground cover. Succeeds in a moist, well-drained circum-neutral soil in full sun, preferring a sweet calcareous clay soil. Succeeds in poor soils. A very important food plant for the caterpillars of many butterfly and moth species[30] it is also a good bee plant[54]. A good companion plant in the lawn, tolerating trampling[18, 54], but it dislikes growing with henbane or members of the buttercup family[18]. It grows well in an apple orchard, the trees will produce tastier fruit that stores better[201]. It should not be grown with camellias or gooseberries because it harbours a mite that can cause fruit drop in the gooseberries and premature budding in the camellias[201]. Polymorphic, there are many subspecies and varieties. Some varieties have also been selected for use in lawn mixes[183]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. Buttercups growing nearby depress the growth of the nitrogen bacteria by means of a root exudate[201]. Special Features:Not North American native, Invasive. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2].

5.1.15 *Lupinus nootkatensis*

Blue Lupine, Nootka lupine
tfo2n 4 tlin 8 cyuc 3 kcaak 3 tcan 0 dwat 0.7 m hkuc
htuc cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

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

pcista The seed of many lupin species contain bitter-tasting toxic alkaloids, though there are often sweet varieties within that species that are completely wholesome[65, 76]. Taste is a very clear indicator. These toxic alkaloids can be leached out of the seed by soaking it overnight and discarding the soak water. It may also be necessary to change the water once during cooking. Fungal toxins also readily invade the crushed seed and can cause chronic illness[65].

kcakta Edible Parts: Root Seed SeedpodEdible Uses: Seed - cooked[105]. Used as a protein-rich vegetable or

kcakta Edible Parts: SeedEdible Uses: Seed - raw or cooked[27, 61]. It can be eaten before it is fully ripe in the same way as broad beans, the fully ripe seed requires overnight soaking to soften it before it is cooked. Leaves - cooked[105]. Used like spinach.

tcanta Fibre Green manure Soap makingA good green manure crop, it is best sown in the spring. Relatively fast growing, producing a good bulk and fixing nitrogen[87]. The upright growth is not a very good weed suppresser though. A fibre is obtained from the stems. The burnt stems are rich in potassium and can be used in making soap.

nrakta Long cultivated for its seed, the original habitat is obscure. ksacta Not known in a truly wild situation.

propta Pre-soak the seed for 24 hours in warm water and then sow in situ in spring or autumn.

nwatta Prefers a fairly heavy loam but succeeds in a sunny position in most soils that are well-drained[1]. Grows well in heavy clay soils. Dislikes dry conditions[57]. Sometimes cultivated for its edible seed, though more commonly as a green manure crop[87]. Tick beans are not as winter-hardy as other forms of this species and so are best sown in the spring. The autumn sown varieties are more susceptible to 'chocolate spot' fungus (which can be remedied by the addition of potash to the soil) but are more likely to escape damage from aphids[87]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. When removing plant remains at the end of the growing season, it is best to only remove the aerial parts of the plant, leaving the roots in the ground to decay and release their nitrogen.

5.1.11 *Vicia faba equina*

Horsebean

tfo2n 4 tlin 8 cyuc 3 kcak 3 tcan 0 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta *Vicia faba equina* is a ANNUAL growing to 1 m (3ft 3in) at a fast rate. See above for USDA hardness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

pcista Although often used as an edible seed, there is a report that eating the seed of this plant can cause the disease 'Favism' in susceptible people[76]. Favism only occurs in cases of excessive consumption of the seed (no more details are given[K]) and when the person is genetically inclined towards the disease[213].

kcakta Edible Parts: Leaves SeedEdible Uses: Seed - raw or cooked[27, 61]. It can be eaten before it is fully ripe in the same way as broad beans, the fully ripe seed requires overnight soaking to soften it before it is cooked. Leaves - cooked[105]. Used like spinach.

tcanta Fibre Green manure Soap makingA good green manure crop, sown in autumn or spring. Relatively fast growing, producing a good bulk and fixing nitrogen[87]. The upright growth is not a very good weed suppresser though. A fibre is obtained from the stems. The burnt stems are rich in potassium and can be used in making soap.

nrakta Long cultivated for its seed, the original habitat is obscure. ksacta Not known in a truly wild situation.

propta Pre-soak the seed for 24 hours in warm water and then sow in situ in spring or autumn.

nwatta Prefers a fairly heavy loam but succeeds in a sunny position in most soils that are well-drained[1]. Grows well in heavy clay soils. Dislikes dry conditions[57]. Sometimes cultivated for its edible seed, more commonly as a green manure crop[87]. There are 2 main types, 'daffa' beans are the more hardy and can be sown in the autumn, whilst 'tic' beans are best sown in spring. The autumn sown varieties are more susceptible to 'chocolate spot' fungus (which can be remedied by the addition of potash to the soil) but are

more likely to escape damage from aphids[87]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. When removing plant remains at the end of the growing season, it is best to only remove the aerial parts of the plant, leaving the roots in the ground to decay and release their nitrogen.

5.1.12 *Vicia sativa leucosperma*

Winter Tares

tfo2n 4 tlin 8 cyuc 3 kcak 3 tcan 0 dwat 1.2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta *Vicia sativa leucosperma* is a ANNUAL CLIMBER growing to 1.2 m (4ft) at a fast rate. See above for USDA hardness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to September, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). The plant is self-fertile. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista There is some evidence that the seed may be toxic but this has only been shown under laboratory conditions, there are no recorded cases of poisoning by this plant in Britain[76].

kcakta Edible Parts: Leaves SeedEdible Uses: TeaSeed - cooked[22, 74]. Not very palatable nor very digestible but it is very nutritious[2, 115]. The seed can be dried, ground into a powder and mixed with cereal flour to make bread, biscuits, cakes etc[183]. The beans compliment the protein in the cereal making it more complete[K]. Some caution is advised, see the notes above on toxicity. Leaves, young shoots and young pods - cooked[105, 177, 183]. The leaves are a tea substitute[183].

tcanta Green manureA very valuable green manure crop, it can be sown in spring or as late as October. A deep rooted and fast growing plant, it is winter hardy, an effective weed suppresser, produces a good bulk and fixes a large amount of nitrogen[87].

nrakta Europe, including Britain, from Scandinavia south and east to N. Africa and W. Asia. ksacta Hedges and grassy places, avoiding acid soils or shady positions[17].

propta Pre-soak the seed for 24 hours in warm water and sow in situ from late winter to early summer and again in the autumn.

nwatta Succeeds in any well-drained soil in a sunny position if the soil is reliably moist throughout the growing season, otherwise it is best grown in semi-shade[200]. This subspecies is the form usually grown for food[74]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

5.1.13 *Vicia sativa*

Winter Tares, Garden vetch, Subterranean vetch

tfo2n 4 tlin 8 cyuc 3 kcak 3 tcan 0 dwat 1.2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta *Vicia sativa* is a ANNUAL CLIMBER growing to 1.2 m (4ft) at a fast rate. See above for USDA hardness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to September, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). The plant is self-fertile. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista There is some evidence that the seed may be toxic but this has only been shown under laboratory conditions,

but will then be slow to germinate[133]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer. Division - best done in spring but it can also be done in autumn[1, 111]. Another report says that division is best carried out in the autumn or late winter because the plants come into growth very early in the year[233].

nwatta Thrives in most soils and in the light shade of trees[1]. Grows well in heavy clay soils. Prefers a moist soil in sun or semi-shade[200]. Plants will only thrive in a sunny position if the soil remains moist throughout the growing season[238]. Prefers a calcareous soil. This species is not included in the Flora of North America[270] and so it should be considered doubtful that its range includes this region. A very ornamental plant[233], there are some named forms[238]. It grows well in open woodlands[1, 4]. Members of this genus seem to be immune to the predations of rabbits and deer[233]. A greedy plant, inhibiting the growth of nearby species, especially legumes[54]. Closely related to *A. fischeri* and considered to be part of that species by some botanists[1].

4.2.273 *Centaurea montana*

Mountain Cornflower, Perennial cornflower, Mountain Bluet

3 tlin 9 cyuc 0 kcak 0 tcan 2 dwat m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatprikliwsslip hpa7mwatli fyifxre7t hjonli

drutta *Centaurea montana* is a PERENNIAL growing to 0.5 m (1ft 8in) by 1 m (3ft 3in) at a fast rate. See above for USDA hardness. It is hardy to UK zone 3 and is not frost tender. It is in flower from May to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

tcanta Can be used as a ground cover plant in a sunny position[188, 208].

dwatta Antitussive Astringent Diuretic Emmenagogue Ophthalmic Purgative TonicMountain cornflower is seldom used in modern herbalism, though it does still have a reputation in parts of Europe as a wash for tired eyes[268]. It is considered to be most effective on blue eyes, great plantain (*Plantago majus*) being used for brown eyes[268]. The dried flowers are antitussive, astringent, weakly diuretic, emmenagogue, ophthalmic, very mildly purgative and tonic[9]. An infusion can be used as a treatment for dropsy, constipation, as a mouthwash for bleeding gums and as an eye bath for conjunctivitis[9].

nrakta Europe. ksacta Mountain woodland margins and meadows[9].

propta Seed - sow March in a greenhouse. When they are large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in the summer. The seed is best sown as soon as it is ripe in August in a greenhouse, overwintered under cover, and planted out in spring. Division in autumn. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the summer or following spring. This should be done at least once every three years in order to maintain the plants vigour. Basal cuttings in spring. Harvest the shoots when they are about 5 - 10cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Landscape Uses:Border, Container, Massing, Specimen. Succeeds in ordinary garden soil[1, 200]. Prefers a moist well-drained fertile soil and a sunny position[200]. Tolerates dry, low fertility and alkaline soils[200]. Plants are hardy to at least -20°C[187]. A very ornamental plant[1], there are some named varieties[187]. The plants have creeping rhizomes and form spreading patches[187]. A good bee plant[108]. Members of this genus are rarely if ever troubled

by browsing deer[233]. Special Features: Attractive foliage, Invasive, Naturalizing, Suitable for cut flowers.

4.2.274 *Delphinium menziesii*

Menzies' Larkspur

3 tlin 7 cyuc 0 kcak 0 tcan 1 dwat m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Delphinium menziesii* is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardness. It is hardy to UK zone 3. It is in flower from April to June. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista All parts of the plant are toxic[172]. The plant is most toxic when it is young[200].

tcanta Dye ParasiticideA parasiticide is obtained from the leaves[172]. It is quite toxic and so is for external use only. A blue dye can be obtained from the flowers[257].

dwatta Parasiticide PouliticeA poultice of the stalks and roots has been applied to sores[257].

nrakta Western N. America - British Columbia to California. ksacta Coastal bluffs and prairies to lower montane meadows[60]. Meadows and open woodlands from sea level to 1000 metres[270].

propta Seed - sow March/April in a cold frame or May outdoors[111]. Keep moist and in a shady position until germination takes place[175]. The seed has a limited viability so it should be stored in a sealed container at about 3°C[200]. Temperatures above 15°C inhibit germination[175]. The seed usually germinates in 2 - 9 weeks at 15°C[175]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in the summer. Cuttings of basal shoots in April/May, taken before they become hollow at the base, and planted in a cold frame[111]. Division in spring[111] or early autumn[200].

nwatta Prefers a rich well-drained soil[111, 200]. Dislikes water-logged soils[200]. Requires an open sunny position[188]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

4.2.275 *Geranium maculatum*

Spotted Cranesbill, Spotted geranium, Crowfoot, Wild Geranium, Cranesbill

3 tlin 10 cyuc 0 kcak 2 tcan 3 dwat m hkuc htut cyutli tucpha7n hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Geranium maculatum* is a PERENNIAL growing to 0.6 m (2ft) by 0.5 m (1ft 8in) at a medium rate. See above for USDA hardness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist or wet soil.

tcanta Dye Miscellany TanninA brown dye is obtained from the flowers[168]. The roots and the leaves are rich in tannin[4]. Plants are suitable for ground cover when spaced about 45cm apart each way[208].

dwatta Antidiarrhoeal Antiseptic Astringent Cholera Diuretic Dysentery Kidney Miscellany Styptic TonicThe whole plant, but especially the root, is antiseptic, highly astringent, diuretic, styptic and tonic[4, 21, 102, 165, 222, 238]. An infusion of the whole plant, or of the roots alone, is used in the treatment of diarrhoea (especially in children and the elderly), dysentery, irritable bowel syndrome, cholera, kidney complaints, bleeding and a wide range of other ailments[61, 213, 254]. It is often used in combination with other herbs[238]. Externally, it is applied to purulent wounds, haemorrhoids, thrush, vaginal discharges and inflammations of the mouth[238]. The plants are rich in tannin[213], the root containing 10 - 20%[222]. The roots can be harvested in the autumn then dried and stored[213]. It is best to harvest the roots as the plant comes into flower since it is then at its

most active medicinally[4]. The leaves are harvested as the plant come into flower and are dried for later use[238].

nrakta Eastern N. America - Maine to Georgia, west to Arkansas, Kansas and Manitoba. ksacta Wet places in woods, wet rocks and in swamps[187]. Woodlands, thickets and meadows[43].

propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Landscape Uses:Border, Container, Massing, Woodland garden. Succeeds in any moderately fertile retentive soil in a sunny position[200]. Tolerates a wide range of soil types[200], including water-logged soils[187]. Plants are hardy to about -25°C[187]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Special Features: Attractive foliage, North American native, Naturalizing, Attracts butterflies, Suitable for cut flowers, Fragrant flowers, Attractive flowers or blooms. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

4.2.276 Bromus inermis

Smooth Brome, Pumpelly's brome

3 tlin 7 cyuc 0 kcaak 2 tcan 0 dwat 1.2 m hkuc hmimhtut cyuti kyuctup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Bromus inermis is a PERENNIAL growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in May, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

tcanta Soil stabilizationAn excellent plant to grow for controlling soil erosion because of its fast-growing interlocking root system[269]. It is especially valuable in semi-arid regions, such as the Prairie Provinces of Canada and the Great Plains of the United States[269]. Growth starts early in spring with a further period of growth in early autumn under favourable moisture conditions[269].

nrakta N. Europe, eastwards to China. ksacta Not known

propta Seed - sow spring in situ. The seedbed should be firm and seed should not be covered to more than 6 - 13 mm depth. Seed rates of 3.3 kilos per hectare are used when the plant is sown in a pure stand, though it is more often sown in a mixture with various legumes such as alfalfa, sweet clover, red clover or Lotus corniculatus[269]. There are approximately 300,000 seeds per kilo[269].

nwatta Best adapted to regions with moderate rainfall and moderate cool summer temperatures, it is suited to silt or clay soils and deep loams, but also does well on light sandy soils and on well-drained soils. Plants are less drought resistant than crested wheatgrass and they do not tolerate temperature extremes. Smooth brome is suited for irrigated areas but is not recommended for saline or alkali soils[269]. Smooth brome is reported to tolerate an annual precipitation of 32 to 176cm, an annual average temperature range of 4.3 to 19.9°C and a pH in the range of 4.9 to 8.2[269]. Smooth brome is also reported to tolerate alkali conditions,

disease, drought, frost, fungi, grazing, mycobacterium, salt, viruses, and weeds[269]. There are a number of named varieties, selected mainly as hay and pasture crops. These cultivars are divided into two groups, northern and southern. The southern group is less cold-hardy and does not survive average winter conditions further north than southern Minnesota in N. America, the northern group is much more cold tolerant[269]. The genus Bromus contains many complex, polyploid series. Bromus inermis belongs to section Bromopsis, containing wild species with chromosome numbers ranging from 2x to 8x. Following its introduction to North America, smooth brome, an aggressive species, has tended to replace native American species of sect. Bromopsis, especially B. pumpellianus. Hybridization studies have been made between: B. inermis, 8x; B. pumpellianus, 8x; and material of the introduced B. erectus complex (6x, 8x, 10x, though the last is probably itself hybrid). An objective of these studies was to incorporate into inermis the larger seeds of pumpellianus and better seedling vigour of erectus. The three species are related, crossable and give quite fertile hybrids. Collections of B. inermis in North America show varying meiotic irregularity and aneuploidy. This is probably a result of introgression from B. pumpellianus and the B. erectus complex. Quite a high degree of meiotic irregularity may be tolerated under natural conditions in a long lived, cross-pollinated species such as B. inermis, which can spread aggressively by rhizomes[269].

4.2.277 Anemone canadensis

Canadian Anemone

3 tlin 7 cyuc 0 kcaak 0 tcan 2 dwat 0.6 m hkuc hmim cyuti tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyfxre7t hjonli

drutta Anemone canadensis is a PERENNIAL growing to 0.6 m (2ft) by 0.3 m (1ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from May to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil. The plant can tolerate maritime exposure.

pcista Although no specific mention has been seen for this species, many members of this genus contain protoanemonin, an irritating acrid oil that is an enzymatic breakdown product of the glycoside ranunculin. While protoanemonin can cause severe topical and gastrointestinal irritation, it is unstable and changes into harmless anemonin when plants are dried or heated[4, 10, 19, 65, 270].

dwatta Anthelmintic Antiaphonic Antiseptic Astringent Ophthalmic StypticThe roots and leaves are astringent and styptic[222]. The root and leaves of this plant was one of the most highly esteemed medicines of the Omaha and Ponca Indians[207]. A decoction of the root was used as an anthelmintic and to treat pain in the lumbar region[257]. An infusion of the root was used as an eye wash to treat crossed eyes, twitches and eye poisoning[257]. A wash of the pounded boiled root or of the leaves was applied externally to wounds, nosebleeds, sores etc[213, 222, 257]. The root contains anemonin, which is said to be a potent anti-septic[213]. A tea of the roots was used in the treatment of headaches and dizziness[213]. The root was eaten to clear the throat so that a person could sing well[257].

nrakta Eastern and Central N. America from Labrador to Massachusetts, Illinois and Colorado. ksacta Damp thickets, meadows, wet prairies, lake shores, streambanks, clearings and occasionally swampy areas at elevations from 200 - 2800 metres[270].

propta Seed - best sown in a cold frame as soon as it is ripe in the summer[1]. Surface sow or only just cover the seed and keep the soil moist. Sow stored seed as soon as possible in late winter or early spring. The seed usually germinates in 1 - 6 months at 15°C[133]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for at least their first year. When the plants are large enough, plant them out in the spring. Division in late summer after the plant dies down.

about 4mm long and is produced in pods up to 10cm long that contain 4 - 8 seeds[82]. A nutritional analysis is available[218]. Young seedpods - cooked[105]. The pods contain a sweetish pulp that is safe to eat and is relished by small children[201]. (This report is quite probably mistaken, having been confused with the honey locust, *Gleditsia* spp[K]). A strong, narcotic and intoxicating drink is made from the skin of the fruit[13]. Piperonal is extracted from the plant, it is used as a vanilla substitute[105]. No further details. All the above entries should be treated with some caution, see the notes at the top of the page regarding toxicity. Flowers - cooked. A fragrant aroma, they are used in making jams and pancakes[7, 183]. They can also be made into a pleasant drink[183].

tcanta Dye Essential Fibre Fodder Fuel Oil Soil stabilization WoodAgroforestry Uses: This species has been widely planted for shelterbelts and windbreaks, and is also used to produce woody biomass for energy production[1050]. It suckers freely, especially if coppiced, and can be used for stabilizing banks etc[200 , 226]. It is used in restoration and rehabilitation projects because its extensive root system holds and stabilizes the soil surface, it sprouts vigorously and prolifically, it increases soil fertility through nitrogen fixation, and it forms a leaf litter that protects the soil. Its main use has been in the rehabilitation of former surface mine sites and for erosion control, but it is also used to rehabilitate contaminated soils, depleted soils, gravel pits, and logged areas, and to stabilize railroad embankments and highway edges[1050]. The plant is often found as a pioneer on old fields, burned areas, and lands strip-mined for coal[418]. The leaves are rich in tannin and other substances which inhibit the growth of other plants[13]. The flowers are a rich source of nectar. Honey produced from this nectar is considered to be of high quality and fetches a price premium. Other Uses: A drying oil is obtained from the seed[2 , 7]. An essential oil is obtained from the flowers. Highly valued, it is used in perfumery[7 , 57 , 100]. A yellow dye is obtained from the bark[223]. Robinetin is a strong dyestuff yielding with different mordants different shades similar to those obtained with fisetin, quercetin, and myricetin; with aluminum mordant, it dyes cotton to a brown-orange shade[269]. The bark contains tannin, but not in sufficient quantity for utilization[223]. On a 10% moisture basis, the bark contains 7.2% tannin and the heartwood of young trees 5.7%[223]. The bark is used to make paper and is a substitute for silk and wool[13]. The wood is close-grained, exceedingly hard, heavy, very strong (due to a high lignin content), resists shock and is very durable in contact with the soil. It weighs 45lb per cubic foot. It does not shrink much when drying. The wood is used in shipbuilding and for making fence posts, tree nails, flooring, furniture, woodenware etc[4 , 7 , 11 , 13 , 46 , 61 , 82 , 149 , 171 , 227 , 418 , 1050]. The wood of *Robinia pseudoacacia* var. *rectissima*, the so called 'Long Island' or 'Shipmast' locust, has a greater resistance to decay and wood borers, outlasting other locust posts and stakes by 50 - 100%[269]. A very good fuel[82 , 418], but it should be used with caution because it flares up and projects sparks[226]. The wood is also used for making charcoal[418]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Antispasmodic Antiviral Aromatic Cancer Chologogue Diuretic Emetic Emollient Febrifuge Laxative Narcotic Purgative TonicFebrifuge[13, 46]. The flowers are antispasmodic, aromatic, diuretic, emollient and laxative[218]. They are cooked and eaten for the treatment of eye ailments[218]. The flower is said to contain the antitumor compound benzaldehyde[269]. The inner bark and the root bark are emetic, purgative and tonic[4, 7, 218, 257]. The root bark has been chewed to induce vomiting, or held in the mouth to allay toothache[222, 257], though it is rarely if ever prescribed as a therapeutic agent in Britain[4]. The fruit is narcotic[13]. This probably refers to the seedpod. The leaves are chologogue and emetic[7]. The leaf juice inhibits viruses[218].

nrakta Eastern N. America - Appalachian and Ozark mountain ranges. Naturalized in Britain[17]. ksacta Woods and thickets[43], especially in deep well-drained calcareous soils[149].

propta Seed - pre-soak for 48 hours in warm water and sow the seed in late winter in a cold frame[80]. A short stratification improves germination rates and time[80]. Prick out the seedlings into individual pots when they are large enough

to handle and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in the following summer. Other reports say that the seed can be sown in an outdoor seedbed in spring[78, 98]. The seed stores for over 10 years[113]. Suckers taken during the dormant season.

nwatta Agroforestry Services: Nitrogen Agroforestry Services: Windbreak Fodder: Bank Industrial Crop: Biomass Management: Coppice Management: Standard Minor Global Crop Other Systems: SRLandscape Uses:Erosion control, Firewood, Aggressive surface roots possible. Succeeds in any well-drained soil, preferring one that is not too rich[1, 200]. Succeeds in dry barren sites, tolerating drought and atmospheric pollution[60, 200]. Succeeds in a hot dry position. The plant is reported to tolerate an annual precipitation in the range of 61 to 191cm, an annual temperature in the range of 7.6 to 20.3°C and a pH of 6.0 to 7.0[269]. A fast-growing tree for the first 30 years of its life[188, 269], it can begin to flower when only 6 years old, though 10 - 12 years is more normal[229]. The flowers are a rich source of nectar and are very fragrant[82] with a vanilla-like scent[245]. The branches are brittle and very liable to wind damage[200]. When plants are grown in rich soils they produce coarse and rank growth which is even more liable to wind damage[11, 200]. The plants sucker freely and often form dense thickets, the suckers have vicious thorns[226]. There are some named varieties selected for their ornamental value[188], some of these are thornless[226]. Any pruning should be done in late summer in order to reduce the risk of bleeding[200]. The leaves are rich in tannin and other substances which inhibit the growth of other plants[13]. A very greedy tree, tending to impoverish the soil[13]. (Although a legume, I believe it does not fix atmospheric nitrogen[K]) A very good bee plant[7, 13, 20, 201]. This species is notably resistant to honey fungus[88, 200]. Special Features: North American native, Invasive, Naturalizing, All or parts of this plant are poisonous, Attracts butterflies, Fragrant flowers, Blooms are very showy. The plant is heat tolerant in zones 9 through 3. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A sprouting standard sending up shoots from the base [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

5.1.10 Vicia faba minuta

Tick Bean

tfo2n 4 tlin 8 cyuc 3 kcaak 3 tcan 0 dwat m hkuc hmimhtut cyuti tcup hwicli hrasjlutnyikrip hpa7tli flatprikliwis hpa7tmwatli fyfxre7t hjonli

drutta *Vicia faba minuta* is a ANNUAL growing to 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

pcista Although often used as an edible seed, there is a report that eating the seed of this plant can cause the disease 'Favism' in susceptible people[76]. Favism only occurs in cases of excessive consumption of the seed (no more details are given[K]) and when the person is genetically inclined towards the disease[213].

more hardy and can be sown in the autumn in cool temperate areas. 'Windsor' beans, which are considered to be finer flavoured, are less tolerant of the cold and so are best sown in spring[132

]. Autumn sown varieties are more susceptible to 'chocolate spot' fungus, this problem can be alleviated by the addition of potash to the soil[87

]. Black fly can be a major problem. Autumn sown crops are less likely to be affected. Pinching out the soft tips of the plants, one they are tall enough and are beginning to flower, can reduce the problem since the blackfly always start on the soft shoots and then spread to the older stems. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200

]. When removing plant remains at the end of the growing season, it is best to only remove the aerial parts of the plant, leaving the roots in the ground to decay and release their nitrogen.

5.1.7 Elaeagnus orientalis

Trebizond Date

tfo2n 4 tlin 8 cyuc 4 kcaak 2 tcan 2 dwat 12 m hkuc htut cyutli hgatkycutcup hwicli hyishrasjlutnyik hpa7tli flat-prikklwis hpa7tmwatli xre7t hjonli

drutta Elaeagnus orientalis is a deciduous Shrub growing to 12 m (39ft) by 6 m (19ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

kcakta Edible Parts: Fruit SeedEdible Uses: Fruit - raw or cooked[3, 105]. Sweet and mealy but of better quality than the closely related *E. angustifolia*[183]. Eaten fresh or made into sherbet and preserves. The fruit must be fully ripe before it can be enjoyed raw, if even slightly under-ripe it will be quite astringent[K]. The oval fruit is about 10mm long and contains a single large seed[K]. Seed - raw or cooked. It can be eaten with the fruit though the seed case is rather fibrous[K].

tcanta Hedge HedgePlants can be grown as a hedge in exposed positions, tolerating maritime exposure.

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

nrakta W. Asia. ksacta By streams and on river banks, to elevations of 3000 metres in Turkey[93].

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

nwatta Succeeds in most soils that are well-drained[11, 200]. Prefers a soil that is only moderately fertile, succeeding in very poor soils and in dry soils[11, 200]. Established plants are very drought resistant[1]. Prefers a light sandy loam and a sunny position[11, 200]. Dislikes shallow chalk soils[98]. Very closely related to *E. angustifolia* and often considered

to be no more than a sub-species of it[183], it does not flower so freely in Britain as that species[11]. This species is notably resistant to honey fungus[88, 200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. An excellent companion plant, when grown in orchards it can increase yields from the fruit trees by up to 10%. The flowers are very fragrant and are rich in nectar[183], they are much visited by bees. Occasionally cultivated for its edible fruit, there are some named varieties[183]. The fruit used to be commonly sold in the markets of Iran and Turkey but is rarely found there nowadays[183].

5.1.8 Hedysarum occidentale

Liquorice Root, Western sweetvetch

tfo2n 4 tlin 8 cyuc 4 kcaak 0 tcan 0 dwat 0.1 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikklwis hpa7tmwatli xre7t hjonli

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

kcakta Edible Parts: RootEdible Uses: Root - raw or cooked[212]. Long and sweet with a liquorice-like flavour[183]. Used in the spring it is crisp and juicy* but it becomes tough and woody as the season advances.

nrakta Western N. America - Montana to Washington, south to Utah and Colorado. ksacta Dry and often rocky soils of open areas, from the plains to about 2,600 metres[212].

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

nwatta Easily grown in ordinary garden soil in a sunny position, preferring a deep well-drained sandy loam[1, 200]. Plants strongly resent root disturbance and should be placed in their permanent positions as soon as possible[1]. This species is closely related to *H. boreale*[212]. Does well in the rock garden or border[1]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

5.1.9 Robinia pseudoacacia

Black Locust, Yellow Locust

tfo2n 4 tlin 9 cyuc 3 kcaak 4 tcan 2 dwat 25 m hkuc htut cyutli hgatkycutcup hwicli hyishrasjlutnyik hpa7tli flat-prikklwis hpa7tmwatli xre7t hjonli

drutta Robinia pseudoacacia is a deciduous Tree growing to 25 m (82ft) by 15 m (49ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in June, and the seeds ripen from November to March. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. It can tolerate atmospheric pollution.

pcista All parts of the plant (except the flowers) and especially the bark, should be considered to be toxic[4, 65, 76]. The toxins are destroyed by heat[65].

kcakta Edible Parts: Flowers Oil Seed SeedpodEdible Uses: Condiment Drink OilSeed - cooked[2, 55, 61]. Oily[161]. They are boiled and used like peas[183]. After boiling the seeds lose their acid taste[213]. The seed is

nwatta Landscape Uses:Border, Woodland garden. Succeeds in ordinary garden soil but prefers a well-drained woodland soil and some shade[200]. An easily grown plant, preferring a sunny position[233]. Plants succeed in maritime gardens[233]. Hardy to at least -20°C[187]. This species is closely related to *A. virginiana*[200]. Plants seem to be immune to the predations of rabbits[233]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54]. A good woodland plant[1, 187]. Special Features:North American native, Naturalizing, Suitable for cut flowers.

4.2.278 Mitella diphylla

Mitrewort, Twoleaf miterwort

3 tlin 7 cyuc 0 kcaak 2 tcan 1 dwat 0.4 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikklwis hpa7tmwatli xre7t hjonli

drutta Mitella diphylla is an evergreen Perennial growing to 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 3. It is in leaf all year; in flower from May to June. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

tcanta A good ground cover in moist woodland[200]. Plants form a carpet and should be spaced about 45cm apart each way[208].

dwatta Febrifuge OphthalmicAn infusion of the leaves is used to treat fevers[200]. The infusion can also be used as eye drops for sore eyes[257].

nrakta Eastern N. America - Quebec to Minnesota, North Carolina and Missouri. ksacta Rich woodlands, meadows and swamps[200, 235].

propta Seed - have no information for this species but suggest sowing it as soon as it is ripe or in early spring in a greenhouse. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts.

nwatta Succeeds in moist woodlands and in pockets in rock gardens[200]. Requires a moist humus-rich soil[208]. Self-sows when grown in a rich soil[200] and usually spreads quickly by this means[208]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

4.2.279 Actaea pachypoda

White Baneberry

3 tlin 7 cyuc 0 kcaak 0 tcan 2 dwat 0.8 m hkuc hmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikklwis hpa7tmwatli xre7t hjonli

drutta Actaea pachypoda is a PERENNIAL growing to 0.8 m (2ft 7in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from June to July, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

pcista All parts of the plant are toxic, causing severe gastrointestinal inflammation and skin blisters[222].

dwatta Antipruritic Antirheumatic Emmenagogue Galactagogue Hypnotic Oxytotic Stimulant VDTThe whole plant, but especially the root, is anticonvulsive, antirheumatic, emmenagogue, mildly hypnotic, oxytotic and stimulant[207, 257]. Use with caution, see the notes above on toxicity[222]. A decoction of the roots has been used in the treatment of coughs, colds, rheumatism and syphilis[213, 257]. It is also used in small doses to ease the pain of childbirth[222] and is used as a stimulant to revive and rally patients at the point of death[257]. An infusion of the roots has been used externally to treat itchy skin and as a gargle

for sore throats[257]. An infusion of leaves was drunk by the women of some Indian tribes in order to stimulate the flow of milk[213].

nrakta Eastern N. America - S. Canada to Georgia, west to Oklahoma and Minnesota. ksacta Deciduous forests, less often with pines, junipers, or other conifers[270].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame or in a sheltered outdoor bed[200]. Completely remove the seed pulp since this can inhibit germination. Stored seed does not usually germinate well[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in late spring or early summer of the following year. Division in spring.

nwatta Tolerates most conditions[233], but prefers a humus-rich moist soil in light shade[200, 233]. Grows best in the wild or woodland garden[200]. This species is closely related to *A. rubra*[200].

4.2.280 Packera obovata

Roundleaf ragwort

3 tlin 8 cyuc 0 kcaak 2 tcan 0 dwat 0.6 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flat-prikklwislip hpa7tmwatli hjonli

drutta Packera obovata is an evergreen Perennial growing to 0.6 m (2ft) by 0.6 m (2ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. The flowers are pollinated by Bees, Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Like many species of ragwort, the plant is toxic to many herbivorous mammals, but sheep seem more tolerant than other grazing animals.

tcanta An effective, evergreen ground cover. Erosion control. Invertebrates shelter: beneficial for insects and other arthropods. Nectary: provides nectar or pollen for beneficial insects [1-2]. Valued for its ability to thrive in shady locations, naturalize rapidly and produce a long and profuse spring bloom of bright yellow flowers [368-1]. Suitable locations include wild gardens, cottage gardens, native plant gardens (US), borders, or along streams/ponds.

nrakta Native range: northern Mexico, the eastern United States and southeastern Canada, extending from Coahuila to Quebec and Ontario. ksacta Moist but well-drained calcareous soils, wooded slopes, and rocky areas in shaded or semi-shaded locations.

propta Seed will germinate within 4 weeks if sown at 20°C/70°F. Seed requires light to germinate. Root division during winter dormancy.

nwatta Moist, well-drained soils in full sun to part shade. Blooms well in shady locations. Tolerates some soil dryness [368-1]. Bloom Notes: Blooms February to April in southerly regions, April to June in the north. Bloom Description: Yellow. Naturalize rapidly and produce a long and profuse spring bloom of bright yellow flowers [368-1]. Like many species of ragwort, the plant is toxic to many herbivorous mammals, but sheep seem more tolerant of it than are most other grazing animals. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2].

4.2.281 Digitalis grandiflora

Large Yellow Foxglove

3 tlin 10 cyuc 0 kcaak 0 tcan 2 dwat 0.9 m hkuc hmimhtut cyutli hgatkycutcup hwicli hrasjlutnyik hpa7tli flat-prikklwis hpa7tmwatli xre7t hjonli

drutta Digitalis grandiflora is an evergreen Perennial growing to 0.9 m (3ft) by 0.3 m (1ft in) at a medium rate. It is in leaf all year; in flower from July to August, and the seeds ripen in September. The species is hermaphrodite (has

both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

pcista All parts of the plant are poisonous[7, 65].

dwatta Cardiac Stimulant TonicThe leaves are cardiac, stimulant and tonic[46, 61]. They are often used in the treatment of certain heart complaints.

nrakta Europe to W. Asia. ksacta Woods in mountains[50, 148] and in drier stonier habitats[200].

propta Seed - surface sow early spring in a cold frame. The seed usually germinates in 2 - 4 weeks at 20°C[175]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer.

nwatta Landscape Uses: Border, Specimen. An easily grown plant, succeeding in ordinary garden soil, especially if it is rich in organic matter[1]. It also succeeds in dry soils and, once established, is drought tolerant[188, 190]. It prefers semi-shade but succeeds in full sun if the soil is moist[188, 200]. Plants are hardy to about -20°C[187]. A short-lived perennial or biennial[187]. Members of this genus are rarely if ever troubled by browsing deer and rabbits[233]. Special Features: Not North American native, All or parts of this plant are poisonous, Suitable for cut flowers, Attractive flowers or blooms.

4.2.282 Adonis amurensis

3 tlin 7 cyuc 0 kcaak 0 tcan 1 dwat 0.3 m hkuc hmimhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta Adonis amurensis is a PERENNIAL growing to 0.3 m (1ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from February to March, and the seeds ripen from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention of toxicity has been seen for this plant, it belongs to a genus that contains a number of poisonous plants so the following remarks are likely to apply to this species - a toxic principle is present in very small quantities in the plant. It is poorly absorbed so poisoning is unlikely.

dwatta Cardiotonic Diuretic SedativeThe root is cardiotonic[174, 218]. The whole plant is an effective diuretic and tranquilliser[218].

nrakta E. Asia - Siberia to China, Japan and Korea. ksacta Found in mountains[174]. Forests and grassy slopes in E Heilongjiang, Jilin and Liaoning provinces, China[266].

propta Seed - best sown in a cold frame as soon as it is ripe or else it can be slow to germinate[1]. Sow the seed in partial shade in rich soil in September or March[111]. When large enough to handle, prick the seedlings out into individual pots and grow the plants on for their first winter in a cold frame. Plant out in late spring or early summer. Division in early spring or in autumn. The divisions can be difficult to establish[200], so it is probably best to pot them up first and keep them in a cold frame or greenhouse until they are growing away actively.

nwatta Grows well in ordinary garden soil and in the light shade of shrubs[1, 111]. Prefers a sunny position and a humus-rich soil[111]. Prefers a moist well-drained soil in sun or semi-shade[200]. A very ornamental plant[1]. A greedy plant inhibiting the growth of nearby plants, especially legumes[54]. Plants take about 4 years from seed to flowering[111].

4.2.283 Galanthus nivalis

Snowdrop, Common Snowdrop

3 tlin 9 cyuc 0 kcaak 0 tcan 1 dwat 0.2 m hkuc hmim cyutli tcup hwicli jutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Galanthus nivalis is a BULB growing to 0.2 m (0ft 8in) by 0.1 m (0ft 4in) at a medium rate. See above for

USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in leaf from January to June, in flower from February to March, and the seeds ripen from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

pcista The bulb is somewhat poisonous[100, 200]

dwatta EmmenagogueThe plant is emmenagogue[4].

nrakta Europe, including Britain, the Netherlands to the Pyrenees, east to N. Syria, S. E. Russia, W. Asia. ksacta Shady pastures, woods and orchards, usually on damp soils[4, 13, 17]. Probably native in Wales and W. England, but naturalized in other parts of Britain[17].

propta Seed - best sown as soon as it is ripe in a cold frame[1]. Sow the seed thinly so that there is no need to thin them. The seed usually germinates in the spring[1]. Grow them on in the same pot in a cold frame for the first two years, giving an occasional liquid feed to ensure the plants do not become nutrient deficient. Pot up the small bulbs whilst they are still in leaf in early summer of their second year's growth, putting about 3 bulbs in each pot. Grow them on in the cold frame for a further year before planting them out into their permanent positions in late spring whilst they are still in growth. The plants take about 4 years to flower from seed[200]. Division of offsets[1, 200]. This is best done immediately after the plants have finished flowering (and still have green leaves) though it can also be done in late summer and early autumn when the plants are dormant[200]. Scooping.

nwatta Landscape Uses:Alpine garden, Border, Container, Foundation, Massing, Rock garden, Woodland garden. Prefers a moist heavy loam[108], growing well in grass or amongst shrubs[1]. Prefers a shady position[28, 31]. The dormant bulbs are fairly hardy and will withstand soil temperatures down to at least -5°C[214]. A very ornamental plant[1], it grows well on the woodland edge[24]. The bulbs should be planted about 5 - 7cm deep as early in the spring as possible[1]. A good bee plant, providing an early source of pollen and nectar[108]. Special Features:Not North American native, Naturalizing, All or parts of this plant are poisonous, Fragrant flowers.

4.2.284 Echinops latifolius

3 tlin 7 cyuc 0 kcaak 0 tcan 1 dwat 0.5 m hkuc

htut cyutli hgatkyuctup hwicli vyhshrasljutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Echinops latifolius is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

dwatta Antiinflammatory GalactogogueThe root is anti-inflammatory and galactogogue[176]. It is used in the treatment of breast abscesses with inflammation, mastitis, lack of milk in nursing mothers and distension of the breasts[176].

nrakta E. Asia - China, Siberia, Mongolia. ksacta Grassland and open forests at elevations of 100 - 2200 metres[266].

propta Seed - sow early spring in a cold frame[111]. The seed usually germinates in 3 - 9 weeks at 25°C[175]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. The seed can also be sown in an outdoor seedbed in mid spring and is then planted out into its permanent position in late summer or the autumn[111]. Division in autumn[111]. Root cuttings in the winter[200].

nwatta Succeeds in a sunny position in any well drained soil of low or medium fertility[200]. Established plants are drought tolerant[190]. The flowers are often used for dried flower displays[200]. If all the flowers are removed early in the season, the plant will often produce a second flush of bloom later in the summer[200].

loamy soil with loose topsoil supplied with lime[269]. It does not tolerate waterlogging and fails to grow on acid soils[269]. Grows well on light soils[206]. The plant has a deep taproot and, once established, tolerates drought and extremely dry conditions[52, 269]. Prefers a neutral fertile soil[87] but succeeds in relatively poor soils so long as the appropriate Rhizobium bacteria is present[200]. A good bee plant[46] and a food plant for many caterpillars[30]. Alfalfa is a very deep rooting plant, bringing up nutrients from deep in the soil and making them available for other plants with shallower root systems. It is a good companion plant for growing near fruit trees and grape vines so long as it is in a reasonably sunny position, but it does not grow well with onions or other members of the Allium genus[201]. Growing alfalfa encourages the growth of dandelions[201]. Alfalfa has long been cultivated for its edible seed, which can be sprouted and eaten in salads. It is also grown as a green manure and soil restorer. There are many named varieties[183]. Botanists divide the species into a number of sub-species - these are briefly described below:- M. sativa caerulea (Less. ex Ledeb.)Schmalh. This sub-species is likely to be of value in breeding programmes for giving cold tolerance, drought resistance and salt tolerance to alfalfa. M. sativa falcata (L.)Arcang. This sub-species is likely to be of value in breeding programmes for giving cold tolerance, drought and disease resistance plus salt and water-logging tolerance to alfalfa. M. sativa sativa. The commonly cultivated form of alfalfa. M. sativa varia (Martyn.)Arcang. This sub-species is likely to be of value in breeding programmes for giving cold tolerance, drought resistance and high yields to alfalfa. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. The plant is heat tolerant in zones 8 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

5.1.6 Vicia faba major

Broad Bean, Fava Bean

hf0zn 4 tlin 10 cyuc 4 kcaak 3 tcan 1 dwat m hkuc hmimhtut cyutli hgtatcup hwicli hrasljutnyikfrip hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta Vicia faba major is a ANNUAL growing to 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure.

pcista Although often used as an edible seed, there are reports that eating the seed of this plant can cause the disease 'Favism' in susceptible people[7, 76]. Inhaling the pollen can also cause the disease[7, 218]. Favism, which is a severe haemolytic anaemia due to an inherited enzymatic deficiency[218], only occurs in cases of excessive consumption of the raw seed (no more details are given[K]) and when the person is genetically inclined towards the disease[7, 213]. About 1% of Caucasians and 15% of Negroids are susceptible to the disease[218].

kcakta Edible Parts: Leaves SeedEdible Uses: Immature

seed - raw or cooked. Broad bean seeds are very nutritious and are frequently used as items of food. The seeds can be eaten raw when they are small and tender, as they grow older they can be cooked as a vegetable[2, 7, 16, 132, 183]. They have a very pleasant floury taste[K]. There are some potential problems to the use of these seeds if they are consumed in large quantities[7] - see the notes above on toxicity. Mature seeds can be eaten cooked as a vegetable or added to soups etc[2, 7, 16, 183]. They are best soaked for 12 - 24 hours prior to cooking in order to soften them and reduce the cooking time[K]. They will also become more nutritious this way[K]. The flavour is mild and pleasant with a floury texture[K]. They can also be dried and ground into a flour for use in making bread etc with cereal flours[183]. The seed can also be fermented to make tempeh[183]. Made into a paste, they can be used as a sandwich filling[299]. The seed can be sprouted before being cooked[183]. Popped seeds can be salted and eaten as a snack or roasted like peanuts[183]. Young pods - cooked and eaten as a vegetable[183]. They quickly become fibrous as they grow larger[183]. and also develop a hairy coating inside the pods that can become unpleasant as the pods get larger[K]. Young leaves - cooked. They are very nutritious and can be used like spinach[105, 183].

tcanta Fibre Soap makingAgroforestry Uses: The stems and leaves are sometimes used as a green manure[299]. Broad beans grow well with carrots, cauliflowers, beet, cucumber, cabbages, leeks, celeriac, corn and potatoes, but is inhibited by onions, garlic and shallots[18, 20]. Other Uses: A fibre is obtained from the stems. The burnt stems are rich in potassium and can be used in making soap. The dried stems can be burnt as a fuel[299].

dwatta DiureticThe seedpods are diuretic and lithon- triptic[7].

nrakta Long cultivated for its seed, the original habitat is obscure. ksacta Not known in a truly wild situation.

propta Pre-soak the seed for 24 hours in warm water and then sow in situ in succession from late winter until early summer. Germination should take place in about 7 - 10 days. The earlier sowings should be of suitably hardy varieties such as the 'Longpods' whilst later sowings can be of the tastier varieties such as the 'Windsors'. By making fresh sowings every 3 weeks you will have a continuous supply of fresh young seeds from early summer until early autumn. If you want to grow the beans to maturity then the seed needs to be sown by the middle of spring. You may need to protect the seed from the ravages of mice. Another sowing can be made in middle to late autumn. This has to be timed according to the area where the plants are being grown. The idea is that the plants will make some growth in the autumn and be perhaps 15 - 20cm tall by the time the colder part of winter sets in. As long as the winter is not too severe, the plants should stand well and will grow away rapidly in the spring to produce an earlier crop. The plants will also be less likely to be attacked by blackfly. Make sure you choose a suitably hardy variety for this sowing.

nwatta Broad beans originated in warm temperate areas and can be cultivated from the cold temperate zone to the subtropics, and also at higher elevations from 1,300 - 3,800 metres in the tropics. It may flower well in the lowland tropics, but usually does not produce pods[299]

]. The ideal temperature range in the growing season is between 18 - 27°C, at higher temperatures the flowers are often aborted[200]

]. The plant requires an annual rainfall of 700 - 1,000mm, of which more than 60% should occur during the growing period[299]

]. Prefers a fairly heavy loam but succeeds in a sunny position in most soils that are well-drained[1, 200

]. Grows well in heavy clay soils. Dislikes dry conditions according to some reports[87, 200

], whilst another says that it is drought tolerant once established[132

]. Prefers a pH in the range 5.5 to 7[200

]. There are two main forms of this species - small seeded forms that are more commonly grown for feeding livestock and as a green manure, and larger seeded forms that are usually grown for human food. Of the larger seeded forms there are two main types:- 'Longpod' beans are the

hydroxy-N-methyltryptamine, and gramine (toxic). The root bark is mixed with a native source of beta-Carbolines to produce a hallucinogenic drink called prairiehuasca, which is an analog of the shamanic brew ayahuasca.

dwatta Antipruritic OphthalmicA leaf tea has been used in the treatment of itchy skin[222, 257]. Five seeds have been placed in the eye at night and washed out in the morning to treat trachoma[257].

nrakta N. America - Ohio to N. Dakota, New Mexico to Mississippi. ksacta Prairies, river banks and fields[222, 235]. Ditches, stream bottoms, fields, roadsides and low areas, often on clay soils[274].

propta Seed - pre-soak for 12 hours in warm water and then sow in a cold frame in the spring. Prick out the seedlings into individual pots as soon as they are large enough to handle and plant them out into their permanent positions in early summer. If you have sufficient seed then it is probably worthwhile sowing some in situ in mid to late spring.

nwatta Agroforestry Services: Nitrogen Management-Standard Staple Crop: Protein Under Development-Requires a moist but well-drained soil in full sun[200]. Plants are often found growing in clay soils in the wild[274]. Suitable for the wild garden or other naturalistic plantings[200]. In favourable situations this plant can self-sow to the point of nuisance[200]. This plant is being evaluated by the Land Institute of Salina, Kansas, as an edible legume for growing with perennial grains in a non-tillage permaculture system[183]. It is certainly worthy of more attention in this country, though the small seed size mitigates against its use[K]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

5.1.5 Medicago sativa

Alfalfa, Yellow alfalfa

tfo2n 4 tlin 8 cyuc 4 ckac 4 tcan 3 dwat 1 m hkuc
htut cytuli hgtakuyctcup hwicli hyhsrjaslutnyk hpa7tli flat-prikliwis hpa7tmwatli fyfxre7t hjonli

drutta Medicago sativa is a PERENNIAL growing to 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to July, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). The plant is self-fertile. It can fix Nitrogen. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista The plant contains saponin-like substances[222]. Eating large quantities of the leaves may cause the breakdown of red blood cells[222]. However, although they are potentially harmful, saponins are poorly absorbed by the human body and so most pass through without harm. Saponins are quite bitter and can be found in many common foods such as some beans. Thorough cooking, and perhaps changing the cooking water once, will normally remove most of them from the food. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K]. Alfalfa sprouts (and especially the seeds) contain canavanine. Recent reports suggest that ingestion of this substance can cause the recurrence of systemic lupus erythematosus (an ulcerous disease of the skin) in patients where the disease had become dormant[222]. The FDA advises that children, the elderly and people with compromised immune systems should avoid eating alfalfa sprouts due to bacterial contamination. Avoid during pregnancy and lactation. Avoid for people with hormone sensitive cancer. Avoid for people with gout (due to purines). Possible antagonism of the anticoagulant effect of warfarin (due to vit K) and interfere with the immunosuppressant effect of corticosteroids [301].

ckakta Edible Parts: Leaves Oil SeedEdible Uses: Oil TeaLeaves and young shoots - raw or cooked[2, 8, 52, 145]. The leaves can also be dried for later use[55]. Very rich in vitamins[183], especially A, B and C[201], they are also a good

source of protein[206]. The leaves are a rich source of vitamin K[213]. A very nutritious food in moderation, though it can trigger attacks in patients with systemic lupus erythematosus and large quantities can affect liver function and cause photosensitization[238]. A nutritional analysis is available[218]. The seed is commonly used as a sprouted seed which is added to salads[2, 20, 52], used in sandwiches etc or cooked in soups[183]. The seed is soaked in warm water for 12 hours, then kept moist in a container in a warm place to sprout. It is ready in about 4 - 6 days[244]. The seeds can also be ground into a powder and used as a mush, or mixed with cereal flours for making a nutritionally improved bread etc[183, 213, 244]. Seed yields average around 186 - 280 kilos per hectare[269]. An appetite-stimulating tea is made from the leaves[21, 55], it has a flavour somewhat reminiscent of boiled socks[144] and is slightly laxative[159].

tcanta Biomass Companion Dye Green manure Hedge Hedge Oil PaperOften grown as a green manure. It is a bit slow to establish in its first year so is generally only recommended for positions where it can remain for 2 or more years. Alfalfa is very vigorous from its second year, producing a huge bulk of material that can be cut down 2 or 3 times during the season[20, 87]. Plants are very deep rooting, descending 6 metres or more into the soil[200], and are able to fix large quantities of atmospheric nitrogen, this makes them one of the very best green manures. Plants are rather intolerant of competition from grass etc, however, and there is the drawback of needing to leave them in the soil for more than 2 years to fully achieve their potential[K]. Alfalfa is a potentially excellent source of biomass. It is possible to produce more than 2 tonnes of protein from the leaves (suitable for human use) per hectare per year. In addition, the plant residues remaining could be used to produce the equivalent of about 10 barrels of oil per year[269]. A yellow dye is obtained from the seed[269]. The fibre of the plant has been used in making paper[269]. The seed yields about 8.5 - 11% of a drying oil. It is used in paints, varnish etc[46, 57, 61, 269]. The plant can be grown as a low dividing hedge in the vegetable garden[52, 206]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Anodyne Antibacterial Antiscorbutic Aperient Diuretic Emetic Febrifuge Haemostatic Hypoglycaemic Nutritive Stimulant TonicAlfalfa leaves, either fresh or dried, have traditionally been used as a nutritive tonic to stimulate the appetite and promote weight gain[222]. The plant has an oestrogenic action and could prove useful in treating problems related to menstruation and the menopause[254]. Some caution is advised in the use of this plant, however. It should not be prescribed to people with auto-immune diseases such as rheumatoid arthritis[238]. See also the notes above on toxicity. The plant is antiscorbutic, aperient, diuretic, oxyctic, haemostatic, nutritive, stimulant and tonic[55, 165, 218]. The expressed juice is emetic and is also anodyne in the treatment of gravel[218]. The plant is taken internally for debility in convalescence or anaemia, haemorrhage, menopausal complaints, pre-menstrual tension, fibroids etc[238]. A poultice of the heated leaves has been applied to the ear in the treatment of earache[257]. The leaves can be used fresh or dried[238]. The leaves are rich in vitamin K which is used medicinally to encourage the clotting of blood[213]. This is valuable in the treatment of jaundice[213]. The plant is grown commercially as a source of chlorophyll and carotene, both of which have proven health benefits[222]. The leaves also contain the anti-oxidant tricin[222]. The root is febrifuge and is also prescribed in cases of highly coloured urine[218]. Extracts of the plant are antibacterial[218]. Used for asthma, diabetes, gastrointestinal disorders (anti-ulcer) [301].

nrakta Europe - Mediterranean. More or less naturalized in Britain[17]. Ksacta Waste ground, avoiding acid soils[17].

propta Pre-soak the seed for 12 hours in warm water and then sow in spring in situ. The seed can also be sown in situ in autumn[52]. Seed can be obtained that has been inoculated with Rhizobium bacteria, enabling the plant to succeed in soils where the bacteria is not already present.

nwatta Global Crop Management: Hay Staple Crop: ProteinAlfalfa is a very versatile plant that can adapt to a wide range of climatic conditions from cold temperate to warm sub-tropical.[269]. It succeeds on a wide variety of soils[52, 269], but thrives best on a rich, friable, well-drained

4.2.285 Symphytum orientale

White comfrey

3 tlin 9 cyuc 0 ckac 3 tcan 0 dwat 0.8 m hkuc
hmimhtut cytuli tcup hwicli hrasjlutnykfrp hpa7tli flatprikliwis hpa7tmwatli hjonli

drutta Symphytum orientale is a deciduous Perennial growing to 0.8 m (2ft 6in) by 0.5 m (1ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. The flowers are pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. It cannot tolerate atmospheric pollution.

pcista This plant contains small quantities of a toxic alkaloid which can have a cumulative effect upon the liver. Largest concentrations are found in the roots, leaves contain higher quantities of the alkaloid as they grow older and young leaves contain almost none. Most people would have to consume very large quantities of the plant in order to do any harm, though anyone with liver problems should obviously be more cautious. In general, the health-promoting properties of the plant probably far outweigh any possible disadvantages, especially if only the younger leaves are used. Use topically on unbroken skin. May cause loss of appetite, abdominal pain, vomiting. Do not use with Eucalyptus. Do not combine with herbs containing pyrrolizidine alkaloids (e.g. agrimony, alpine ragwort, help, tansy ragwort) [301].

tcanta The plant grows very quickly, producing a lot of bulk. It is tolerant of being cut several times a year and can be used to provide 'instant compost' for crops such as potatoes. Simply layer the wilted leaves at the bottom of the potato trench or apply them as a mulch in no-dig gardens. A liquid feed can be obtained by soaking the leaves in a small amount of water for a week, excellent for potassium demanding crops such as tomatoes. The leaves are also a very valuable addition to the compost heap[26, 200]. A gum obtained from the roots was at one time used in the treatment of wool before it was spun[100]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch. Landscape Uses: Border, Ground cover, Specimen. One of the more attractive comfreesys. A good bee plant.

nrakta Native to: Lebanon-Syria, Turkey, Turkey-in-Europe, Ukraine. Introduced into: Slovakia, Czech Republic, France, Great Britain, Italy. ksacta Hedgerows and copses, on lane sides, by roads and railways, on waste ground. It is often naturalised, and sometimes regenerates from seed.

propta Seed - sow spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. If you have sufficient seed you can try an outdoor sowing in situ in the spring. Division succeeds at almost any time of the year. Simply use a spade to chop off the top 7cm of root just below the soil level. The original root will regrow and you will have a number of root tops, each of which will make a new plant. These can either be potted up or planted out straight into their permanent positions.

nwatta A clump-forming, hairy, herbaceous to semi-evergreen perennial. Bell-shaped, white flowers in early summer. Tolerates most soils and situations but prefers a moist soil and some shade[1, 4]. Grows well in heavy clay soils. Best grown in an open sunny site in a deep rich soil if it is being grown for compost material[200]. Not as invasive as other Symphytum species. The root system is very deep and difficult to eradicate, even small fragments of root left in the soil can produce new plants. Special Features:Attractive foliage, Edible, Fragrant foliage, Not North American native, Invasive, Naturalizing. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of 'heat days' experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-

ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2]. The root pattern is fleshy. Thick or swollen - fibrous or tap root [1-2]. This plant is the ornamental variety and so often mistaken for Common Comfrey it has the same distinct leaf continuation down the stem but is softer and more esthetically pleasing than Common Comfrey (Symphytum officinal).

4.2.286 Primula auricula

3 tlin 7 cyuc 0 ckac 0 tcan 1 dwat 0.2 m hkuc
hmim cytuli tcup hwicli hrasjlutnykfrp hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Primula auricula is a PERENNIAL growing to 0.2 m (0ft 8in) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

tcanta When growing in the right conditions this species and its cultivars make a good ground cover[208]. They are best spaced about 30cm apart each way[208].

dwatta AntitussiveThe leaves are used as a remedy for coughs[4]. Used in the treatment of headaches[61].

nrakta Europe - Alps and Carpathian mountains. ksacta Rock crevices or wet alpine grassland[50].

propta Seed - best sown as soon as it is ripe in a cold frame. Sow stored seed in early spring in a cold frame. Germination is inhibited by temperatures above 20°C. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in autumn.

nwatta Prefers a freely-draining moderately fertile humus-rich sandy loam[200]. Prefers an alkaline soil[188]. Grows well in heavy clay soils[208]. Dislikes dry soils[200]. Requires some shelter from the summer sun[1, 200]. Grows well in the shade of a north wall but does not like growing under trees[208]. A very ornamental and polymorphic species[1]. The flowers are sweetly honey-scented[245].

4.2.287 Carex sylvatica

Wood sedge

3 tlin 8 cyuc 0 ckac 3 tcan 0 dwat 0.6 m hkuc
hmimhtut cytuli tcuphja7n hwicli jlutnykfrp hpa7tli flat-prikliwis hpa7tmwatli hjonli

drutta Carex sylvatica is an evergreen Perennial growing to 0.6 m (2ft) by 0.6 m (2ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3. The flowers are pollinated by Wind, Insects. It is noted for attracting wildlife. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

tcanta InsulationA good evergreen ground cover supplying winter interest. Can be used on slope or Banks. Good in containers. Can make a good edging plant. Deer resistant and shade tolerant. Recommended as a groundcover under trees and shrubs. Wildlife Habitat - provides cover for small wildlife. Fiber. C. sylvatica was used as wadding in order to retain heat by Laplanders (English Botany. Sowerby and Smith, 1802). Ornamental [318-1].

nrakta Europe, Asia, and far east to Iran.Introduced to North America, and New Zealand. ksacta Deciduous woodlands on heavy soils; Sometimes found in unwooded areas.

propta Propagate by plant division in spring or seedling in the fall.

nwatta C. sylvatica is a clump-forming, log-lived, evergreen to semi-evergreen perennial 0.15m to 0.6m (6 inches - 24 inches) high and a spread of 0.15m to 0.6m (6 inches - 24 inches). It has a moderate Growth Rate. It prefers sun

to partial shade and loamy to clay soil. Soil moisture is wet, to moderate and soil pH: 5.8 - 7.0. it is drought intolerant. There are a few distinct subspecies. It can be evergreen or deciduous. Non-mycorrhizal. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is rhizomatous with underground stems sending roots and shoots along their length.

4.2.288 *Potentilla norvegica*

Norwegian Cinquefoil

3 tlin 7 cyuc 0 kcaak 0 tcan 1 dwat 0.3 m hkuc
hmimhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatpriklwis hpa7tmwatli fyfjxre7t hjonli

drutta *Potentilla norvegica* is a ANNUAL/PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from June to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

dwatta The root is astringent. A decoction of the root has been gargled, or the root has been chewed, in the treatment of sore throats[257]. A cold infusion of the whole plant has been used to relieve pain[257]. The plant has been burnt and the fumes used to treat sexual infections[257]. All the above uses are recorded for the sub-species *P. norvegica mopseliensis*. (L.)Aschers. and Graebn.[257].

nrakta Northern Temperate zones, through Asia, Europe to N. America. Naturalized in Britain[17]. ksacta Waste ground, southwards from Inverness but mainly in south-eastern England[17].

propta Seed - sow early spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Easily grown in a well-drained loam, preferring a position in full sun but tolerating shade[1]. Prefers an alkaline soil but tolerates a slightly acid soil[200]. An annual, biennial or short-lived perennial plant[17]. Members of this genus are rarely if ever troubled by browsing deer[233].

4.2.289 *Delphinium nudicaule*

Red Larkspur, Larkspur

3 tlin 7 cyuc 0 kcaak 0 tcan 1 dwat 0.3 m hkuc
htut cyutli tcup hwicli hrasljutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta *Delphinium nudicaule* is a PERENNIAL growing to 0.3 m (1ft) by 0.3 m (1ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from June to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista All parts of the plant are toxic[172]. The plant is most toxic when it is young[200].

tcanta A blue dye is obtained from the flowers[207]. An ink can be made from the dye[207]. A parasiticide is obtained from the leaves[172]. It is quite toxic and so is for external use only.

dwatta NarcoticThe root is considered by some native North American Indians to be highly narcotic[213, 257].

nrakta South-western N. America - California, oregon ksacta Dry slopes among shrubs and in woods, below 2150 metres[71]. Moist talus and cliff faces from sea level to 2600 metres[270].

propta Seed - sow March/April in a cold frame or May outdoors[111]. Keep moist and in a shady position until germination takes place[175]. The seed has a limited viability so it should be stored in a sealed container at about 3°C[200]. Temperatures above 15°C inhibit germination[175]. The seed usually germinates in 2 - 9 weeks at 15°C[175]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in the summer. Cuttings of basal shoots in April/May, taken before they become hollow at the base, and planted in a cold frame[111]. Division in spring[111] or early autumn[200].

nwatta Landscape Uses:Border, Container, Foundation, Massing, Rock garden, Seashore, Specimen. Prefers a rich well-drained soil[111, 200]. Dislikes water-logged soils[200]. Requires an open sunny position[188]. Plants can flower in their first year from spring-sown seed, they are reliably perennial in their native environment, but often die overwinter in most parts of Britain[200]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54]. Slugs and snails are very attracted to this plant[200]. Special Features: Attracts birds, Attractive foliage, North American native, All or parts of this plant are poisonous, Suitable for cut flowers, Suitable for dried flowers, Extended bloom season in Zones 9A and above.

4.2.290 *Adonis vernalis*

Pheasant's Eye, Spring pheasant's eye

3 tlin 7 cyuc 0 kcaak 0 tcan 3 dwat 0.3 m hkuc
hmimhtut cyutli kyuctcup hwicli hrasljutnyik hpa7tli flatpriklwis hpa7tmwatli fyfjxre7t hjonli

drutta *Adonis vernalis* is a PERENNIAL growing to 0.3 m (1ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in March, and the seeds ripen from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista A toxic principle is present in very small quantities in the plant[7, 9, 13, 19, 65]. It is poorly absorbed so poisoning is unlikely[65].

dwatta Antianxiety Antiarrhythmic Cardiotonic Diuretic Sedative VasoconstrictorMedicinal Parts: Roots and whole plant[301]. Pheasant's eye has a long history of medicinal use and is still retained in the Pharmacopoeias of several European countries[268]. The plant contains cardiac glycosides similar to those found in the foxglove (*Digitalis purpurea*)[254]. These substances improve the heart's efficiency, increasing its output at the same time as slowing its rate[254]. It also has a sedative action and so is generally prescribed for patients whose hearts are beating too fast or irregularly[254]. The herb is not often prescribed, however, due to irregular absorption[268]. The herb is cardiotonic, diuretic, sedative and vasoconstrictor[4, 7, 9, 13, 46, 238]. It has sometimes been used internally as a cardiotonic with success where the better known foxglove (*Digitalis purpurea*) has failed - especially where there is also kidney disease[4]. The herb is also used in the treatment of low blood pressure and its strong diuretic action can be used to counter water retention[254]. It is included in many proprietary medicines, especially since its effects are not cumulative[238]. The plants are harvested every third year as they come into flower[7], they are dried for use in tinctures and liquid extracts[238]. The herb does not store well so stocks should be replaced every year[238]. Use with great caution[9], see the notes above on toxicity. The plant is used in homeopathy as a treatment for angina[254]. The German Commission E Monographs, a therapeutic guide to herbal medicine approve *Adonis vernalis* for arrhythmia, and nervous heart complaints (see [302] for critics of commission E)

nrakta C. and S. Europe ksacta Sunny grassy hills on dry calcareous soils[9]. A rare plant in most of its range, it has legal protection from gathering in most countries[238].

propta Seed - best sown in a cold frame as soon as it is ripe or else it can be slow and erratic to germinate[200, 238]. Sow the seed in partial shade in rich soil in September or March[111]. Prick out the seedlings when they are large enough to handle and grow them on in the cold frame for

ber, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: Root SeedEdible Uses: Seed - raw or cooked[2, 161]. Two types of seed are produced - flowers produced near the ground produce a pod that buries itself just below soil level. These pods contain a single seed are up to 15mm in diameter which can be used as a peanut substitute. They can be harvested throughout the winter and can be eaten raw or cooked[2, 63, 95, 161]. They are sweet and delicious raw with a taste that is more like shelled garden beans than peanuts[183]. Yields are rather low, and it can be a fiddle finding the seeds, but they do make a very pleasant and nutritious snack[K]. Other flowers higher up the plant produce seed pods that do not bury themselves. The seeds in these pods are much smaller and are usually cooked before being eaten[95, 183]. They can be used in all the same ways as lentils and are a good source of protein[K]. The overall crop of these seeds is rather low and they are also fiddly to harvest[K]. Root - cooked[177, 257]. The root is peeled, boiled and then eaten[257]. Fleshy and nutritious according to one report[200], whilst another says that the root is too small to be of much importance in the diet[257]. Our plants have only produced small and stringy roots[K].

tcanta Nitrogen Fixer.

dwatta An infusion of the root has been used in the treatment of diarrhoea[257]. Externally, the root has been applied to bites from rattlesnakes[257]. A poultice of the pulverized leaves has been applied with any salve to swellings[257].

nrakta Eastern N. America - New Brunswick to Florida, west to Manitoba and Louisiana. ksacta Cool damp woodlands[43, 200].

propta Seed - pre-soak for 12 hours in warm water and then sow in spring in a semi-shaded position in a greenhouse. Germination usually takes place within a few weeks. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter, planting them out in late spring or early summer. Division. We have been unable to divide this plant because it only makes a small taproot. However, many of the seeds are produced under the ground and these can be harvested like tubers and potted up to make more plants.

nwatta Agroforestry Services: Nitrogen Agroforestry Services: Understory legume Historic Crop Management: Fodder Management: Standard Staple Crop: ProteinRequires a moist humus-rich soil in a shady position[200]. The young shoots in spring can be damaged by late frosts[K]. The hog peanut has occasionally been cultivated for its edible seed which has been used as a peanut substitute[183]. Yields at present, however, are rather low[K]. Two types of blossom are produced by the plant - those produced from the leaf axils mostly abort but a few seeds are produced[95]. Solitary, inconspicuous cleistogamous flowers are produced on thread-like stems near the root and, after flowering, the developing seedpods bury themselves into the soil in a manner similar to peanuts[95, 274]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A self-seeding plant [1-2]. Growth habit is herbaceous. Growth habit is a single or multiple shooting vine from a crown [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2].

5.1.3 *Psoralea esculenta*

Breadroot, Large Indian breadroot

tfo2n 4 tlin 8 cyuc 5 kcaak 3 tcan 1 dwat 0.3 m hkuc
htut cyutli kyuctcup hwicli hrasljutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta *Psoralea esculenta* is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to

UK zone 4. It is in flower from May to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

pcista This species contains furanocoumarins, these substances can cause photosensitivity in some people[65].

kcakta Edible Parts: Oil RootEdible Uses: OilRoot - raw or cooked[2, 4, 46, 57, 161]. It can also be dried for later use[183]. The dried root can be ground into a powder and used with cereals in making cakes, porridges etc[183]. Starchy and glutinous, the raw root is said to have a sweetish turnip-like taste[183]. The plant is best harvested as the tops die down at the end of the growing season[85]. This food is a staple and also considered to be a luxury item by many native North American Indian tribes[2, 61]. The root contains about 70% starch, 9% protein and 5% sugars[95].

tcanta Oil Soil stabilizationThe plant is a good soil stabilizer in its natural environment[200].

dwatta Pectoral Poultice StomachicAn infusion of the dried roots has been used in the treatment of gastro-enteritis, sore throats and chest problems[257]. The roots have been chewed by children as a treatment for bowel complaints[257]. A poultice of the chewed roots has been applied to sprains and fractures[257].

nrakta N. America - Manitoba to North Dakota and Wisconsin, south to Missouri and Texas. ksacta Rocky woods and prairies, on calcareous soils[43].

propta Pre-soak the seed for 24 hours in warm water and then sow in early to mid spring in a greenhouse. Either sow the seed in individual pots or pot up the young seedlings as soon as possible in order to avoid root disturbance. Grow them on in the pots until planting out in their final positions. It is usually impossible to transplant this species without fatal damage to the root[200]. Division in spring. With great care since the plant resents root disturbance. It is virtually impossible to divide this species successfully[200].

nwatta Succeeds in an ordinary garden soil[1]. Requires a well-drained soil in a sunny position[200]. Plants are very intolerant of root disturbance, they are best planted out into their permanent positions whilst still small[200]. This plant has been recommended for improvement through breeding and selection for its edible root[183]. It was sent to Europe around the year 1800 as a potential food crop but was not well received[213]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is tuberous with swollen potato-like roots [1-2].

5.1.4 *Desmanthus illinoensis*

Prairie Mimosa, Illinois bundleflower

tfo2n 4 tlin 8 cyuc 4 kcaak 1 tcan 1 dwat 1.3 m hkuc
htut cyutli tcup hwicli hrasljutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta *Desmanthus illinoensis* is a PERENNIAL growing to 1.3 m (4ft 3in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from May to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: SeedEdible Uses: Seed - cooked. Rich in protein but without much flavour[183]. The seedpods are about 25mm long and contain 3 - 5 small seeds[235]. They are freely borne in the plants native environment, but will have to be very freely produced in this country if it is to be a worthwhile crop[K].

tcanta Root bark of *D. illinoensis* has been found to contain N,N-DMT, NMT, N-hydroxy-N-methyltryptamine, 2-

in a sunny position in any well drained soil of low or medium fertility[200]. Established plants are drought tolerant[190]. There are a number of named varieties, selected for their ornamental value[200]. The flowers are often used for dried flower displays[200]. If all the flowers are removed early in the season, the plant will often produce a second flush of bloom later in the summer[200]. Special Features: Naturalizing, Attracts butterflies, Suitable for cut flowers, Suitable for dried flowers, Extended bloom season in Zones 9A and above, Attractive flowers or blooms.

5 4 tlin

5.1 bwon

5.1.1 Hippophae rhamnoides turkestanica

Sea Buckthorn

tfo2n 4 tlin 7 cyuc 5 kcaak 5 tcan 5 dwat 6 m hkuc htuc cyutli hgatkuyctucuphja7n hwicli hyishrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli nyanhjen hjonli

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

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

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

tcanta Charcoal Dye Fuel Soil stabilization WoodVery tolerant of maritime exposure[29, 49, 75, 182], it can be used as a shelter hedge. It dislikes much trimming[75]. A very thorny plant, it quickly makes an impenetrable barrier. Sea buckthorn has an extensive root system and suckers vigorously and so has been used in soil conservation schemes, especially on sandy soils. The fibrous and suckering root system acts to bind the sand[186, 244]. Because the plant grows quickly, even in very exposed conditions, and also adds nitrogen to the soil, it can be used as a pioneer species to help the re-establishment of woodland in difficult areas. Because the plant is very light-demanding it will eventually be out-competed by the woodland trees and so will not outstay its welcome[K]. The seeds contain 12 - 13% of a slow-drying oil[240]. The vitamin-rich fruit juice is used cosmetically in face-masks etc[9]. A yellow dye is obtained from the fruit[74]. A yellow dye is obtained from the stems, root and foliage[4]. A blackish-brown dye is obtained from the young leaves and shoots[74]. Wood - tough, hard, very durable, fine-grained. Used for fine carpentry, turning etc[46, 61, 74]. The wood is also used for fuel and charcoal[146].

dwatta Astringent Cancer Cardiac Eczema Poulitce Tonic Vermifuge Vitamin CThe twigs and leaves contain 4 - 5% tannin[240]. They are astringent and vermifuge[7,

100]. The tender branches and leaves contain bio-active substances which are used to produce an oil that is quite distinct from the oil produced from the fruit. This oil is used as an ointment for treating burns[214]. A high-quality medicinal oil is made from the fruit and used in the treatment of cardiac disorders, it is also said to be particularly effective when applied to the skin to heal burns, eczema and radiation injury, and is taken internally in the treatment of stomach and intestinal diseases[214]. The fruit is used as a tonic[9]. The freshly-pressed juice is used in the treatment of colds, febrile conditions, exhaustion etc[9]. The fruit is a very rich source of vitamins and minerals, especially in vitamins A, C and E, flavanoids and other bio-active compounds. It is also a fairly good source of essential fatty acids, which is fairly unusual for a fruit. It is being investigated as a food that is capable of reducing the incidence of cancer and also as a means of halting or reversing the growth of cancers[214].

nrakta E. Asia - Himalayas in the higher Tibetan plateau. ksacta Uper subalpine to lower alpine zones.

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

nwatta Landscape Uses:Border, Seashore, Specimen. Succeeds in most soils[200], including poor ones[186], so long as they are not too dry[182, 200]. Grows well by water and in fairly wet soils[182]. Established plants are very drought resistant[186]. Requires a sunny position[3], seedlings failing to grow in a shady position and mature shrubs quickly dying if overshadowed by taller plants[186]. Does well in very sandy soils[1, 186]. Plants are very tolerant of maritime exposure[75], though they are fairly slow growing[75]. Although usually found near the coast in the wild, they thrive when grown inland[11] and are hardy to about -25°C[184]. A very ornamental plant[1, 11], it is occasionally cultivated, especially in N. Europe, for its edible fruit[183]. Members of this genus are attracting considerable interest from breeding institutes for their nutrient-rich fruits that can promote the general health of the body (see edible and medicinal uses below)[214]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[113, 186, 200]. Plants produce abundant suckers, especially when grown on sandy soils[186]. Dioecious. Male and female plants must be grown if seed is required. The sexes of plants cannot be distinguished before flowering, but on flowering plants the buds of male plants in winter are conical and conspicuous whilst female buds are smaller and rounded[11]. Plants in this genus are notably resistant to honey fungus[200]. Special Features:Not North American native, Naturalizing, Inconspicuous flowers or blooms.

5.1.2 Amphicarpaea bracteata

Hog Peanut, American hogpeanut

tfo2n 4 tlin 9 cyuc 5 kcaak 3 tcan 1 dwat 1.5 m hkuc pcmhmm cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Amphicarpaea bracteata is a PERENNIAL CLIMBER growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf from May to October, in flower from August to Septem-

their first season. Plant out when dormant in the autumn[K]. Division in early spring or in autumn. The divisions can be difficult to establish[200], so it is probably best to pot them up and keep them in a cold frame or greenhouse until they are growing away well.

nwatta Grows well in any ordinary garden soil that is not too heavy[1]. Prefers a moist well-drained soil in sun or semi-shade[4, 200]. Easily grown in a very well-drained rather dry soil in sun or part shade[187]. Plants flower better when growing in a sunny position[268]. This plant is adored by slugs and is therefore very difficult to grow in the open garden where slugs are common[187]. A very ornamental plant[1], it is rather rare in the wild so only cultivated plants should be harvested[7]. A greedy plant inhibiting the growth of nearby plants, especially legumes[54].

4.2.291 Packera aurea

Golden Groundsel - Life Root, Golden ragwort

3 tin 7 cyuc 0 kcaak 0 tcan 2 dwat 0.8 m hkuc hmimhtut cyutli tucphja7n hwicli hrasjlutnyik hpa7tli flatprikliwisslip hpa7tmwatli xre7t hjonli

drutta Packera aurea is a PERENNIAL growing to 0.8 m (2ft 7in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from May to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

pcista Possible liver damage due to pyrrolizidine alkaloids. Toxic if taken internally (legally restricted in some countries) [301].

dwatta Abortifacient Birthing aid Diaphoretic Diuretic Emmenagogue Pectoral Stimulant Tonic Uterine tonicGolden groundsel is a medicinal plant that is deserving of greater attention[4]. This species was widely used by N. American Indians to treat various complaints of the female reproductive system, and also to ease childbirth[238]. Whilst often stated to be completely safe to use, recent research has found that the plant contains pyrrolizidine alkaloids that, in isolation, can cause liver damage and so this remedy can no longer be recommended for internal use[238, 254]. The roots and leaves are abortifacient, diaphoretic, diuretic, emmenagogue, pectoral, stimulant and uterine tonic[4, 46, 165, 207, 222]. It is used externally in the treatment of vaginal discharge[238]. A tea made from the plant was frequently used by the N. American Indians as a remedy for various female troubles, including the pain of childbirth[207, 213]. Pharmacologists have not reported any uterine effects, but the plant does contain an essential oil (muline) plus the alkaloids senecine and seneconine (which are poisonous to grazing animals)[213]. The plant is harvested before flowering and the roots are harvested in the autumn, both are dried for later use[238].

nrakta Eastern N. America - Newfoundland to Florida, west to Texas. ksacta Rich calcareous woods and bottoms and upland swamps[43]. Damp thickets and prairies[200].

propta Seed - sow spring in a greenhouse. Only just cover the seed. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring[200]. Root cuttings in early spring[200].

nwatta An easily grown plant, it succeeds in a sunny position in most moderately fertile well-drained soils[200]. Prefers a damp to wet soil and also succeeds in partial shade[238]. Succeeds in the wild garden though it is invasive[200]. This species is cultivated in parts of Russia for use in the pharmaceutical industry[238]. A polymorphic species, there are many named varieties[43]. Senecio aureus L. is a synonym of Packera aurea (L.) Á.Löve and D.Löve For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

4.2.292 Myosotis alpestris

Alpine Forget-Me-Not, Scorpion Grass, Forget-Me-Not

3 tin 9 cyuc 0 kcaak 0 tcan 2 dwat 0.2 m hkuc hmimhtut cyutli tucphja7n hwicli hrasjlutnyik hpa7tli prikliwis hpa7tmwatli xre7t hjonli

drutta Myosotis alpestris is a PERENNIAL growing to 0.2 m (0ft 8in) by 0.3 m (1ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from July to September, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

dwatta Astringent OphthalmicThe whole plant is astringent and ophthalmic[7]. Used as a lotion, it is an excellent remedy for many eye diseases[7]. It is also ground into a powder and applied externally to wounds, at one time the leaf juice was used to stop nose bleeds[7]. The plant is harvested in May and can be dried for later use[7].

nrakta Britain, Europe, W. Asia and N. America. ksacta Rare and local in Britain, growing in damp woodlands and meadows, usually on basic rock formations[17, 200].

propta Seed - sow outdoors in situ in late spring or early summer. Germination usually takes place within 2 - 4 weeks at 20°C. Division in spring[111]. Large divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer. Cuttings of young shoots, summer in a shady border[111].

nwatta Landscape Uses:Border, Container, Ground cover, Massing, Rock garden, Woodland garden. Prefers a well-drained gritty soil[245]. Plants are hardy to about -20°C[187]. Members of this genus are rarely if ever troubled by browsing deer[233]. The flowers are deliciously fragrant in the evening and night time though there is little or no scent in the daytime[245]. Special Features: North American native, Naturalizing, Fragrant flowers.

4.2.293 Potentilla simplex

Old Field Cinquefoil, Common cinquefoil

3 tin 7 cyuc 0 kcaak 0 tcan 1 dwat 0.1 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyfxre7t hjonli

drutta Potentilla simplex is a PERENNIAL growing to 0.1 m (0ft 4in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

dwatta Antiseptic Astringent DysenteryThe plant is mildly astringent and antiseptic[207]. A decoction is used as a gargle for loose teeth and spongy gums[207, 257]. An infusion of the roots has been used in the treatment of dysentery[257].

nrakta Eastern and Central N. America - Nova Scotia to North Carolina, Alabama, Minnesota and Missouri. ksacta Locally common in dry open woods, prairie hillsides, roadsides, old fields and waste places[228].

propta Seed - sow early spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Easily grown in a well-drained loam, preferring a position in full sun but tolerating shade[1]. Prefers an alka-

line soil but tolerates a slightly acid soil[200]. Plants grown in rich soils produce more foliage at the expense of flowering[200]. Hardy to about -25°c[200]. Members of this genus are rarely if ever troubled by browsing deer[233].

4.2.294 *Arnica angustifolia alpina*

Mountain Tobacco

3 tin 7 cyuc 0 kcaak 0 tcan 3 dwat 0.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Arnica angustifolia alpina* is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 3. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The whole plant is toxic and should only be used for external applications to unbroken skin[172].

tcanta HairThis plant is used as a hair conditioner[172]. No further details are given.

dwatta Antiechymotic Antiphlogistic Epilepsy Nerve Sternutatory VulneraryThe whole flowering plant is antiechymotic, antiphlogistic, nervine, sternutatory and vulnerary[172]. This species is closely related to *A. montana* and is included in that species by some botanists. The medicinal uses of that plant are as follows:- *Arnica* has a long history of herbal use, especially as an external treatment for bruises and sprains[232, 238] - it is an ingredient of a number of proprietary preparations[238]. Internally, it has been used in the treatment of heart complaints and as a booster for the immune system[238]. *Arnica* increases local blood supply and accelerates healing, it is anti-inflammatory and increases the rate of absorption of internal bleeding[254]. Generally the plant is nowadays only recommended for internal use as a homeopathic medicine, principally for treating shock, injury and pain[254]. If used as a decoction or tincture it stimulates the circulation and is valuable in the treatment of angina and a weak or failing heart, but it can be toxic even at quite low doses and so is rarely used this way[254]. The flowers are the part most commonly used[4, 232], they are harvested when fully open and dried - the receptacles are sometimes removed since these are liable to be attacked by insects[4]. The root is also used, it is harvested after the leaves have died down in the autumn and dried for later use[4]. The whole plant is antiechymotic, antiphlogistic, nervine, sternutatory, vulnerary[4, 7, 9, 46, 165]. Although a very valuable remedy, it should be used with caution. It has been known to cause contact dermatitis when used externally and collapse when taken internally[238]. Only take it internally under the supervision of a qualified practitioner. The freshly crushed flowers cause sneezing if inhaled[232]. The leaves have also been smoked as a tobacco[232], though it is unclear whether this was for medicinal reasons The whole plant, harvested when in flower, is used in homeopathic remedies[232]. It is especially useful in the treatment of traumatic injuries, sores and bruises[232]. The homeopathic dose has also been used effectively in the treatment of epilepsy and seasickness, and it might be of use as a hair growth stimulant[268].

nrakta N. Europe. N. Asia and Northern N. America. ksacta Pasture and open woodland on neutral to calcareous soils[200]. Bare rocky alpine slopes and summits[60].

propta Seed - sow early spring in a cold frame[200]. Only just cover the seed and make sure that the compost does not dry out. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse or cold frame for their first winter. Plant out in late spring or early summer. Division in spring[200].

nwatta Prefers a moist, well-drained humus rich soil, preferably lime-free[200]. This species is more lime tolerant than other members of the genus[200]. Prefers a mixture of sand, loam and peat[1]. Closely related to *A. montana*[268].

4.2.295 *Helleborus niger*

Black Hellebore

3 tin 7 cyuc 0 kcaak 0 tcan 2 dwat 0.3 m hkuc

hmim cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Helleborus niger* is an evergreen Perennial growing to 0.3 m (1ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in leaf all year, in flower from January to February, and the seeds ripen from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

pcista All parts of the plant are poisonous[9, 10, 65], this poison can possibly be absorbed through the skin[76]. The fresh root can be a violent irritant to sensitive skin[244].

tcanta Miscellany ParasiticideUsed as a parasiticide against body lice, fleas etc[76]. This use is somewhat dangerous, see the notes above on toxicity. The powdered root has been used as a snuff[245]. Plants are suitable for ground cover when spaced about 45cm apart each way[208].

dwatta Anthelmintic Antiemetic Cardiac Cathartic Diuretic Emetic Emmenagogue Homeopathy Irritant Miscellany Narcotic Parasiticide PurgativeBlack hellebore is a very poisonous plant that is toxic when taken in all but the smallest doses. As such it should not be taken except under professional supervision. The plant contains cardiac glycosides which have a similar action to the foxglove (*Digitalis* spp) and it has been used as a heart stimulant for the elderly, though this treatment is no longer recommended[254]. The root is anthelmintic, cardiac, cathartic, diuretic, emetic, emmenagogue, irritant, violently narcotic and a drastic purgative[4, 9, 21, 46, 240]. It is harvested in the autumn and dried for later use[4]. It has been used in the treatment of dropsy, amenorrhoea, nervous disorders and hysteria, but it is very poisonous and great care must be taken over the dosage[4]. The root is also applied externally as a local irritant[4], but even this should be done with care, see notes above on toxicity. A homeopathic remedy is made from the roots[9]. It is used in the treatment of headaches, psychic disorders, enteritis and spasms[9].

nrakta S.E. and C. Europe. ksacta Woods and thickets, mainly in mountains, on calcareous soils[50, 187]. Sometimes also found in grassland[187].

propta Seed - best sown as soon as it is ripe in a cold frame[1, 134]. Sow stored seed as early in the year as possible[1], it usually germinates in the autumn to spring. Seed can take 18 months to germinate. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a lightly shaded position in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. This species produces flowering plants in 2 - 3 years from seed[200]. Division after flowering or in autumn. Take care since the plant resents disturbance[111, 200].

nwatta Cultivation of this plant is not always easy, it prefers a rich limy soil in partial shade[187]. Succeeds in any good garden soil[1], growing and flowering best in a moist well-drained rich loam in a sheltered position in partial shade[1, 4, 31, 111, 244]. Succeeds when grown in the shade of a north-facing wall[233]. Does not object to lime[1]. Grows well in heavy clay soils[200]. Dislikes drought. Slugs are very fond of this plant and it will probably require some protection from them[187]. The various species in this genus hybridize freely[95]. Plants can flower in three years from seed[4]. A very ornamental plant, there are many named varieties[187]. Plants resent root disturbance and are slow to re-establish when divided[244]. They are best left undisturbed for 6 - 7 years before being divided[244]. Seedling plants should be placed in their permanent positions whilst still small[200]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

4.2.296 *Actaea rubra*

Red Baneberry

3 tin 7 cyuc 0 kcaak 0 tcan 2 dwat 0.5 m hkuc pcmhmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Actaea rubra* is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.3 m (1ft). See above for USDA hardiness. It

is hardy to UK zone 3. It is in flower from June to July, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

pcista All parts of the plant are toxic[172], apparently acting upon the heart[212].

dwatta Analgesic Antirheumatic Appetizer Emetic Galactogogue Purgative RubefacientThe whole plant, but especially the root, is analgesic, antirheumatic, galactogogue and rubefacient[172, 257]. The plant was often used medicinally by North American Indian tribes, though modern users should be aware of the plants potential toxicity. A tea made from the root is used as an appetizer, in the treatment of stomach pains, coughs, colds, menstrual irregularities, post partum pains, to increase milk flow and as a purgative after childbirth[222, 257]. Great caution should be employed if using this plant internally, the rootstock is a violent purgative, irritant and emetic[212].

nrakta N. America - Alaska to California and eastwards to Newfoundland and Philadelphia. ksacta Moist shady areas, mostly in deciduous forests but also in mixed coniferous forests, open pine or spruce woodlands, swales, stream banks and swamps from sea level to 3500 metres[270].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame or outdoors in a moist shaded seedbed[200]. The seed has a limited viability[200], it can also be sown in spring in a cold frame but germination rates may be poor. When they are large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in late spring or early summer of the following year. Division in March or October.

nwatta Tolerates most conditions[233], but prefers a humus-rich moist soil in light shade[200, 233] doing well amongst shrubs and in light woods[1]. Also succeeds in denser shade[187]. Plants are hardy to at least -20°c[187]. A very ornamental plant[1]. *Actaea rubra* is part of a circumberol complex and is very similar to the black-fruited European species *A. spicata* (L.) with which it is sometimes considered conspecific[270]. The western North American plants of *A. rubra* have been called *A. arguta* and were distinguished on the basis of their smaller berries, more pubescent leaves, and narrow, more dissected leaflets. Those distinctions, however, are weak; specimens from the West often have fruits and leaves similar to those of plants from the East[270]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

4.2.297 *Symphytum grandiflorum*

Ground Cover Comfrey, Comfrey

3 tin 9 cyuc 0 kcaak 4 tcan 0 dwat 0.4 m hkuc pcmhmim cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Symphytum grandiflorum* is a PERENNIAL growing to 0.4 m (1ft 4in) by 0.6 m (2ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to May, and the seeds ripen from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

pcista No reports of toxicity have been seen for this species, but the following reports have been seen for *S. officinale*. This plant contains small quantities of a toxic alkaloid which can have a cumulative effect upon the liver. Largest concentrations are found in the roots, leaves contain higher quantities of the alkaloid as they grow older and young leaves contain almost none. Most people would have to consume very large quantities of the plant in order to do any harm, though anyone with liver problems should obviously be more cautious. In general, the health-promoting properties of the plant probably far outweigh any possible disbenefits, especially if only the younger leaves are used.

tcanta A very good ground cover plant[188, 208]. It spreads rapidly to form a good carpet, rooting as it spreads,

and should be spaced about 60cm apart each way[208]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch. Landscape Uses:Border, Container, Ground cover, Specimen, Woodland Forest Garden. Shelter for insects, nectary, Green mulch. Notable Products: Sheep and chicken food.

nrakta Europe - the Caucasus. Naturalized in Britain. ksacta Not infrequently naturalized in hedges and woods in S. England and the Midlands[17].

propta Seed - sow spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. If you have sufficient seed you can try an outdoor sowing in situ in the spring. Division succeeds at almost any time of the year. Simply use a spade to chop off the top 7cm of root just below the soil level. The original root will regrow and you will have a number of root tops, each of which will make a new plant. These can either be potted up or planted out straight into their permanent positions.

nwatta Tolerates most soils and situations but prefers a moist soil and some shade[1, 4]. Grows well in heavy clay soils. Grows well under trees[208]. There are some named varieties, selected for their ornamental value[200]. Plants can be invasive, often spreading freely by means of self-sown seed[200]. The root system is very deep and difficult to eradicate, even small fragments of root left in the soil can produce new plants. Special Features:Attractive foliage, Fragrant foliage, Invasive, Naturalizing. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

4.2.298 *Echinops ritro*

Globe Thistle, Southern globethistle, Small Globe Thistle

3 tin 10 cyuc 0 kcaak 0 tcan 1 dwat 0.5 m hkuc htuk cyutli hgatkyctup hwicli hyishrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Echinops ritro* is a PERENNIAL growing to 0.5 m (1ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

dwatta Antinflammatory GalactogogueThe root is anti-inflammatory and galactogogue[176]. It is used in the treatment of breast abscesses with inflammation, mastitis, lack of milk in nursing mothers and distension of the breast[176].

nrakta Central and Eastern Europe to Central Asia. ksacta Gravely places on mountain slopes at elevations of 200 - 2400 metres in Tibet[266].

propta Seed - sow early spring in a cold frame[111]. The seed usually germinates in 3 - 9 weeks at 25°c[175]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. The seed can also be sown in an outdoor seedbed in mid spring and is then planted out into its permanent position in late summer or the autumn[111]. Division in autumn[111]. Root cuttings in the winter[200].

nwatta Landscape Uses:Border, Container, Erosion control, Ground cover, Massing, Seashore, Specimen. Succeeds

which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

5.2.48 *Akebia x pentaphylla*

4 tlin 8 cyuc 4 kcak 0 tcan 0 dwat 9 m hkuc
pcimhmihmtut cyutli tcup hwicli hrasjlutnyik hpa7tli flat-prikliwis hpa7tmwatli hjonli

drutta *Akebia x pentaphylla* is a deciduous Climber growing to 9 m (29ft 6in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in April, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: TeaFruit - raw[200]. Sweet but insipid. The fruit has a delicate flavour and a soft juicy texture[K]. The flavour can be enhanced by the addition of a little lemon juice. Valued as a novelty, it looks somewhat like a deep-purple coloured sausage. The dried young leaves are a tea substitute.

tcanta BasketryThe peeled stems are very pliable. They can be bleached and used in basket making[46, 61].

nrakta E. Asia - Japan. ksacta Woods and thickets. A naturally occurring hybrid. A. quinata x A. trifoliata[200].

propta Seed - best sown in a cold frame as soon as it is ripe. Surface sow in a light position[133]. The seed usually germinates in 1 - 3 months at 15°C[133]. Stored seed should be given 1 month cold stratification[113, 133] and can be very difficult to germinate. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for at least their first winter. Plant out in late spring or early summer, after the last expected frosts. This is a hybrid species and so it will not breed true from seed. Cuttings of half-ripe wood, July/August in a frame[11, 113]. The cuttings can be slow to root[200]. Cuttings can also be taken of soft wood in spring[113]. Root cuttings, December in a warm greenhouse[113]. Layering in early spring[1]. Very easy, the plants usually self-layer and so all you need to do is dig up the new plants and plant them out directly into their permanent positions.

nwatta Requires a well-drained moisture retentive soil[200]. Succeeds in acid or alkaline soils[200]. Prefers partial shade but succeeds in full sun[200]. Succeeds on a north facing wall[219]. Dormant plants are hardy to about -15°C but they can be somewhat tender when young and are best given some protection at this time[200]. The young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. Resentful of root disturbance, either grow plants in containers prior to planting them out or plant them out whilst very young[219]. A naturally occurring hybrid. A. quinata x A. trifoliata[200]. Plants are evergreen in mild winters[11, 200]. They are fast growing and can be invasive[200]. Plants are not normally pruned, if they are growing too large they can be cut back by trimming them with shears in early spring[202]. Shy to fruit, it possibly requires some protection in the flowering season - hand pollination is advisable. Plants are also possibly self-sterile. Plants in this genus are notably resistant to honey fungus[200].

5.2.49 *Crataegus acclivis*

4 tlin 8 cyuc 4 kcak 0 tcan 2 dwat 8 m hkuc
hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatprikliwsslip hpa7tmwatli xre7t hjonli

drutta *Crataegus acclivis* is a deciduous Tree growing to 8 m (26ft) by 7 m (23ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to May, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay

soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[K]. The fruit ripens in early September, it is about 18mm long with a pleasantly sweet juicy flesh and makes an excellent dessert fruit[K]. The fruit contains up to 5 seeds in the centre, these usually stick together and so the effect is like eating a cherry with its single large seed[K].

dwatta Cardiac HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta North-eastern N. America - New York to the borders of southern Canada. ksacta Banks of streams and steep gorges[235].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Plants are hardy to at least -18°C[202]. We have very little specific information on this plant, and it is regarded as no more than a form of *C. pedicellata* by most botanists[235]. However, a tree seen at Kew in early September 1997 had a good crop of almost ripe fruit. This fruit was more elongated than *C. pedicellata* and was also ripe about 4 weeks before that species[K]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

5.2.50 *Crataegus submollis*

Quebec Hawthorn

4 tlin 8 cyuc 4 kcak 0 tcan 2 dwat 7 m hkuc
hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatprikliwsslip hpa7tmwatli xre7t hjonli

the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame[78]. Cuttings are not very long-lived[78].

nwatta An easily grown plant, it tolerates most soil conditions other than a water-logged soil[11]. Prefers a position in full sun but tolerates light shade[11]. Grows well on dry sunny banks[1, 182]. Dislikes strong winds, though another report in the same book says that it tolerates salt-laden winds[200]. In our experience the plants are very subject to wind-rock when grown in a windy site[K]. Tolerates atmospheric pollution[182, 200]. A fast growing plant, thriving on poor soils[182, 200]. Plants are hardy to about -20°C[184, 200]. Slugs love the young seedlings[K]. Flowers are produced on the current season's growth[182, 200]. These flowers are very attractive to bees[108]. Plants in this genus are notably resistant to honey fungus[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. The plant is heat tolerant in zones 8 through 6. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2].

5.1.35 *Robinia hispida*

Bristly locust, Rose-acacia, or Moss locust

tfo2n 4 tlin 8 cyuc 0 kcak 3 tcan 1 dwat 3.5 m hkuc
htut cyutli kyucitcup hwicli hyishrasjlutnyik hpa7tli prikliwsslip hpa7tmwatli hjonli

drutta *Robinia hispida* is a deciduous Shrub growing to 3.5 m (11ft) by 2 m (6ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. The flowers are pollinated by Birds, Insects. It can fix Nitrogen. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil.

pcista All parts of this plant are poisonous.

tcanta HedgeNitrogen fixer. Excellent flowers and foliage. Specimen or screen. Good plant for stabilizing embankments and slopes and for planting in poor, dry soils. Interesting informal hedge. Food and shelter for beneficials including shelter for lacewings and parasitoid wasps. Hummingbird nectar plant and bird shelter [1-2].

dwatta Native American Tribe: The Cherokee had several uses for the plant including: Root bark chewed as an emetic. Beaten root held on tooth for toothache. Infusion given to cows as a 'tonic' (brit.org).

nrakta Native Range: Central and eastern United States ksacta Thin upland woodlands, woodland edges, thickets, fence rows, roadside embankments, banks of drainage canals, vacant lots, and overgrown waste areas.

propta Species are raised from seed. While cuttings will strike, the cultivars are usually grafted onto seedling stocks to ensure superior root systems.

nwatta A shrub or small tree which grows in dry woods and slopes. It has been reported to have occasionally escaped from cultivation. Grow in average, dry to medium moisture, well-drained soil in full sun. Prefers organically rich soils, but tolerates poor, dry soils. Flower: Showy. Bloom: Rosy pink to purplish-red. Bloom Time: May. Fruit: Showy. Tolerate: Deer, Drought, Erosion, Dry Soil, Shallow-Rocky Soil. As robinias have brittle branches that can be easily damaged by strong winds, it may be necessary to plant them in a protected spot. Otherwise, these are hardy, easily cultivated trees that will thrive in any bright position with

moist well-drained soil. They can be pruned when young to establish a strongly branched structure. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A clumping plant, forming a colony from shoots away from the crown but with a limited spread [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2].

5.1.36 *Robinia fertilis*

Bristly Locust

tfo2n 4 tlin 8 cyuc 0 kcak 0 tcan 0 dwat 2 m hkuc
htut cyutli hgattkyucitcup hwicli hyishrasjlutnyik hpa7tli flat-prikliwis hpa7tmwatli xre7t hjonli

drutta *Robinia fertilis* is a deciduous Shrub growing to 2 m (6ft 7in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. It can tolerate atmospheric pollution.

tcanta Soil stabilizationPlants produce an extensive suckering root system and can be used for soil stabilization on banks etc.

nrakta South-eastern N. America. ksacta Dry woodland and hillside scrub.

propta Seed - pre-soak for 48 hours in warm water and sow the seed in late winter in a cold frame[80]. A short stratification improves germination rates and time[80]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in the following summer. The seed remains viable for over 10 years in normal storage[113]. Suckers taken during the dormant season.

nwatta Succeeds in any soil, preferring one that is not too rich[1, 200]. Requires a well-drained soil, succeeding on dry barren sites[200]. Plants are tolerant of drought and atmospheric pollution[200]. The branches are brittle and very liable to wind damage[200]. When plants are grown in rich soils they produce coarse and rank growth which is even more liable to wind damage[11, 200]. Plants sucker freely, the suckers have vicious thorns. Any pruning should be done in late summer in order to reduce the risk of bleeding[200]. Hardy to at least -20°C. This species is very closely allied to *R. hispida* and scarcely merits specific rank. A very greedy tree, tending to impoverish the soil. Plants in this genus are notably resistant to honey fungus[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

5.1.37 *Alnus maximowiczii*

tfo2n 4 tlin 8 cyuc 0 kcak 0 tcan 0 dwat m hkuc
hmimhtut cyutli tcuphja7n hwicli hysjlutnyikfrip hpa7tli flat-prikliwis hpa7tmwatli hjonli

drutta *Alnus maximowiczii* is a deciduous Tree growing to 9 m (29ft 6in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from March to April. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. It can fix Nitrogen. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

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

nrakta E. Asia - Japan. ksacta High mountains, often to the alpine zone, C. and N. Japan[58].

propta Seed - best sown in a cold frame as soon as it is ripe and only just covered[200]. Spring sown seed should

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

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

5.1.38 Senna marilandica

Wild Senna, Maryland senna
tfo2n 4 tlin 8 cyuc 0 kcaak 0 tcan 3 dwat m hkuc
hmimhtut cyutli hgatkuyuctup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwlati xre7t hjonli

drutta Senna marilandica is a deciduous Shrub growing to 1.5 m (5ft) by 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

dwatta Cardiac Cathartic Diuretic Febrifuge Poultrice Vermifuge The leaves and seedpods are cathartic, diuretic and vermifuge[1, 11, 21, 46]. The leaves are harvested before and during flowering, the pods are harvested when fully ripe in the autumn. Both are dried for later use[238]. The leaves are a safe and effective cathartic[207, 213]. They are best used with *Foeniculum vulgare* seeds in order to counteract a tendency to cause gripe[207, 213]. The seedpods can also be used and are milder but slower in their action[222]. The seeds have been soaked in water until they are mucilaginous and then swallowed as a treatment for sore throats[213, 257]. The root is cardiac and febrifuge[257]. An infusion has been used in the treatment of fevers and heart problems[257]. A poultice of the root has been used in treating sores[257].

nrakta South-eastern N. America - Pennsylvania to Florida, Kansas and Iowa. ksacta Thickets and dry roadsides[43]. Disturbed areas, sandy fields and open woods in Texas[274].

propta Seed - scarify and then pre-soak the seed for 2 - 3 hours in warm water before sowing it from early spring to early summer in a warm greenhouse[138]. The seed usually germinates in 1 - 12 weeks at 23°C[138]. Prick out the seedlings into individual pots once they are large enough to handle and grow them on in the greenhouse. Do not plant them out until the following spring[138]. Division as growth commences in spring[11]. Cuttings of moderately ripe wood, July in a frame[1].

nwatta Succeeds in most well-drained soils but prefers an open sandy loam in a sunny sheltered position[1, 11, 200]. Established plants are drought tolerant[200]. Succeeds in light shade, but the plant is much less vigorous when grown in dry shade[200]. Although fairly cold-tolerant, plants can be killed in very severe weather, so it is best to mulch the roots of mature plants in bad winters[11]. Younger plants should be mulched each winter until they are well established[200]. Slugs are very attracted to this plant[K]. This

species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

5.1.39 Caragana gerardiana

tfo2n 4 tlin 8 cyuc 0 kcaak 0 tcan 0 dwat 1 m hkuc
htut cyutli tcup hwicli hyishrasjlutnyik hpa7tli flatprikliwis hpa7tmwlati xre7t hjonli

drutta Caragana gerardiana is a deciduous Shrub growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

tcanta Hedge HedgePlants can be grown as a low impenetrable hedge. They are viciously spiny[200].

nrakta E. Asia - North-western Himalayas to southern Tibet at elevations up to 3,900 metres. ksacta Found at elevations of 3700 - 4100 metres in Xizang Province in China.

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

nwatta Prefers full sun and a light sandy dry or well-drained soil in a hot position[11, 182, 200]. Does not require a rich soil, succeeding on marginal land[11, 200]. Plants often do not flower well in British gardens, due in large degree to our lack of summer sun[182]. This species prefers a continental climate with hot summers and cold winters, it does not grow well in areas with mild damp winters[11, 200]. Plants in this genus are notably resistant to honey fungus[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

5.1.40 Lathyrus pratensis

Meadow Vetchling
tfo2n 4 tlin 8 cyuc 0 kcaak 0 tcan 1 dwat 1.2 m hkuc
htut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwlati fyifxre7t hjonli

drutta Lathyrus pratensis is a PERENNIAL growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from May to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist or wet soil.

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

tcanta RepellentThe plant is said to repel mice.

dwatta ResolventThe seeds are used as a resolvent in Spain[240].

nrakta Europe, including Britain, from Scandinavia south and east to N. Africa, Siberia and the Himalayas. ksacta Grassland, scrub and hedgerows, avoiding acid soils[17, 50].

herbs[218]. It is an excellent tonic and restorative, helping in stressful times and increasing zest for life[254]. It is considered to be a substitute for ginseng and is said to be a tonic for both the male and the female sex organs[238]. The fruit is antitussive, aphrodisiac, hepatic, astringent, cardiotoxic, cholagogue, expectorant, hypotensive, lenitive, nervine, pectoral, sedative, stimulant and tonic[174, 176, 178, 218]. Low doses of the fruit are said to stimulate the central nervous system whilst large doses depress it[218]. The fruit also regulates the cardiovascular system[218]. It is taken internally in the treatment of dry coughs, asthma, night sweats, urinary disorders, involuntary ejaculation, chronic diarrhoea, palpitations, insomnia, poor memory, hyperacidity, hepatitis and diabetes[238]. Externally, it is used to treat irritating and allergic skin conditions[238]. The fruit is harvested after the first frosts and sun-dried for later use[238]. The fruit contains lignans[254]. These have a pronounced protective action on the liver. In one clinical trial there was a 76% success rate in treating patients with hepatitis, no side effects were noticed[254]. The seed is used in the treatment of cancer[218]. The plant is antiheumatic[218]. A mucilaginous decoction obtained from the branches is useful in the treatment of coughs, dysentery and gonorrhoea[218].

nrakta E. Asia - China, Japan, Korea. ksacta Mixed forests, especially on the margins, also by streams and brooks, usually on sandy soils[74].

propta Seed - best sown in the autumn in a cold frame[200, 238]. Pre-soak stored seed for 12 hours in warm water and sow in a greenhouse in the spring[238]. Germination can be slow and erratic. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in the greenhouse for their first 2 years. Plant them out into their permanent positions in early summer. Cuttings of half-ripe wood, 5 - 8cm with a heel, August in a frame. Overwinter in the greenhouse and plant out in late spring[11, 78]. Good percentage[78]. Layering of long shoots in the autumn[200].

nwatta Prefers a rich well-drained moisture retentive soil[11, 200]. Prefers a slightly acid soil but tolerates some alkalinity if plenty of organic matter is added to the soil[200]. Requires some protection from the most intense sunlight[200]. Plants succeed in quite deep shade and are suitable for north-facing walls[219]. Plants are intolerant of drought[K]. The fully dormant plant is hardy to about -17°C, though the young growth in spring can be damaged by late frosts. Plants climb by twining around supports. Any pruning is best carried out in the spring[219]. The flowers are sweetly scented[245]. The leaves are also aromatic[245]. Dioecious. Male and female plants must be grown if seed is required. The plant is heat tolerant in zones 9 through 7. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. Growth habit is a single or multiple shooting vine from a crown [1-2].

5.2.47 Crataegus douglasii

Black Hawthorn
4 tlin 8 cyuc 4 kcaak 0 tcan 2 dwat 9 m hkuc
hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrp hpa7tli flatprikliwsslip hpa7tmwlati xre7t hjonli

drutta Crataegus douglasii is a deciduous Tree growing to 9 m (29ft 6in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist

or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 3, 95, 99, 101]. A very pleasant flavour with a sweet and juicy succulent flesh[46, 82, K], it makes an excellent dessert fruit and can be eaten in quantity[K]. The fruit can also be used for making pies, preserves etc, and can be dried for later use[183]. The fruit is about 8mm in diameter and is borne in small clusters[200]. The fruits I have eaten have been considerably larger than this[K]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Needles WoodThe spines on the branches are used as needles for lancing boils, removing splinters etc[99]. Wood - close-grained, heavy, hard and tough. Used for tool handles etc[82, 99, 101].

dwatta Antirheumatic Astringent Cardiotoxic Dysentery Hypotensive Poultrice StomachicAn infusion of the shoots has been used to treat diarrhoea in children and sores in babies mouths[257]. A poultice of the chewed leaves has been applied to swellings[257]. An infusion of the bark has been used in the treatment of diarrhoea and dysentery[257]. An infusion of the sapwood, bark and roots has been used as a stomach medicine[257]. The thorns have been used as a treatment for arthritis[257].The point of the thorn was used to pierce an area affected by arthritic pain. The other end of the thorn was ignited and burned down to the point buried into the skin. This treatment was very painful but it was said that after a scab had formed and disappeared, the arthritic pain had also disappeared[257]. The thorns have been used as probes for boils and ulcers[257]. Although no other specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta Western N. America - British Columbia to Michigan, south to California. ksacta Open woods, banks of mountain streams and on rocky banks[43, 82].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges

a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta Eastern N. America - Ontario to Maine, south to New York and Pennsylvania. ksacta Rich moist hillsides and the borders of streams and swamps[82].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hawthorns in general hybridize freely with other members of the genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. A very ornamental plant[11].

5.2.45 Prunus cerasifera divaricata

4 tlin 8 cyuc 4 kcaak 0 tcan 1 dwat 10 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrp hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Prunus cerasifera divaricata is a deciduous Tree growing to 10 m (32ft 10in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: Fruit SeedEdible Uses: Fruit - raw or cooked[74]. Tastes like a Mirabelle plum[2, 11]. A

very pleasant plum-like flavour when fully ripe with a mealy though juicy flesh[K]. It is high in citric acid, containing about 4.7%[74]. The fruit is about 30mm in diameter and contains one large seed[200]. Seed - raw or cooked. Do not eat the seed if it is too bitter - see the notes above on toxicity.

tcanta Dye RootstockUsed as a rootstock for plums, peaches and apricots[74]. A green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168].

dwatta Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta S.E. Europe to W. Asia. ksacta Mountain slopes in woody or shrubby thickets, on stony slopes, ravine bottoms, near water and montane river valleys to 2000 metres[74].

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200]. Softwood cuttings from strongly growing plants in spring to early summer in a frame[200]. Layering in spring.

nwatta Requires a well-drained moisture retentive soil[11, 200]. Succeeds in light shade but fruits better in a sunny position[11, 200]. Thrives in a loamy soil, doing well on limestone[11]. Grows well in heavy clay soils. Prefers some chalk in the soil but apt to become chlorotic if too much is present[1]. Plants are hardy to about -25°C[184]. According to some botanists this plant should be named *P. divaricata* and *P. cerasifera* should be named *P. divaricata cerasifera*[11]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. Plants in this genus are notably susceptible to honey fungus[200].

5.2.46 Schisandra chinensis

Magnolia Vine, Wu Wei Zi

4 tlin 8 cyuc 4 kcaak 2 tcan 5 dwat 9 m hkuc pcmhmmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli nyanhjen hjonli

drutta Schisandra chinensis is a deciduous Climber growing to 9 m (29ft 6in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from April to May, and the seeds ripen from August to October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). . The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: GumFruit - raw or cooked[183]. Usually dried and used on journeys, it is very sustaining[74]. Rich in sugars[74], it has a sweet/sour flavour[178]. In Russia a paste made from the fruit is mixed with *Actinidia arguta* in order to counteract the insufficient acidity of that species[183]. The fruit is about 6mm in diameter and is borne in a grape-like bunch about 10cm long[200]. Young leaves - cooked and used as a vegetable[105, 177, 183].

tcanta Gum Hair Size WoodA viscid mucoid material is obtained from the fruit and the branches, it is used as a size for paper and as a hair dressing[178]. The dried wood is charmingly fragrant[11].

dwatta Antirheumatic Antitussive Aphrodisiac Astrigent Cancer Cardiotonic Cholagogue Dysentery Expectorant Hepatic Lenitive Nervine Pectoral Sedative Stimulant Tonic UrinaryWu Wei Zi is commonly used in Chinese herbalism, where it is considered to be one of the 50 fundamental

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

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

5.1.41 Coronilla varia

Crown Vetch
tfo2n 4 tlin 9 cyuc 0 kcaak 0 tcan 1 dwat 0.3 m hkuc htut cyutli kyuctup hwicli hyshrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Coronilla varia is a PERENNIAL growing to 0.3 m (1ft) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to November, and the seeds ripen from August to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

pcista The whole plant contains a toxic glycoside called coronillin[9, 13, 19, 65]. It is one of the most toxic plants growing in Britain[9].

tcanta Insecticide Oil Soil stabilizationCan be used as an insecticide[153]. No more details are given. A good ground cover and soil stabilizer for sunny banks and slopes[200, 208]. It grows rampantly and should not be grown with plants less than 1.8 metres tall[208].

dwatta Cardiotonic Emetic SalveThe whole plant, used either fresh or dried is a cardiotonic[9, 13]. It should be used with extreme caution, see the notes above on toxicity[9]. A decoction of the bark has been used as an emetic[257]. The crushed plant has been rubbed on rheumatic joints and cramps[257].

nrakta Europe. Naturalized in Britain[17]. ksacta Dry grassy places, railway embankments, roadsides etc[9].

propta Seed - best sown in situ as soon as it is ripe. The seed usually germinates in the autumn. Stored seed can be pre-soaked for 12 hours in warm water and then sown in situ in April[111]. Cuttings of half-ripe shoots with a heel, June/July in a frame. Can also be taken in spring[111]. Division in March[111]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the summer or following spring.

nwatta Landscape Uses:Erosion control, Ground cover. Prefers an open well-drained calcareous soil in a sunny position[1, 13, 111]. Tolerates poor soils[200]. Tolerates a pH in the range 4.8 to 7.2. A food plant for the caterpillars of many lepidoptera species[30]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. Special Features:Attractive foliage, Invasive, Naturalizing.

5.2 mran

5.2.1 Hemerocallis middendorffii esculenta

4 tlin 8 cyuc 5 kcaak 0 tcan 1 dwat m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyikfrp hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Hemerocallis middendorffii esculenta is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to July. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Large quantities of the leaves are said to be hallucinogenic. Blanching the leaves removes this hallucinatory component[205]. (This report does not make clear what it means by blanching, it could be excluding light from the growing shoots or immersing in boiling water[K].)

kcakta Edible Parts: Flowers LeavesEdible Uses: Leaves and young shoots - cooked[105, 116, 177, 183]. They must be consumed when very young or else they become fibrous[K]. Flowers and flower buds - raw or cooked[105, 127, 177, 183]. The flowers are crisp and succulent with a delicious sweet flavour and no aftertaste[K]. The flowers can be dried and used as a thickener in soups etc. The flower buds contain about 43mg vitamin C per 100g, 983 IU vitamin A and 3.1% protein[205].

tcanta WeavingThe tough dried foliage is plaited into cord and used for making footwear[205]. Plants form a spreading clump and are suitable for ground cover when spaced about 45cm apart each way[208]. The dead leaves should be left on the ground in the winter to ensure effective cover[208]. (This report was for a plant labelled *H. middendorffiana*, which I have assumed is a mis-spelling of this species[K])

dwatta Antidote Diuretic Vitamin CThe juice of the roots is an effective antidote in cases of arsenic poisoning[205]. A tea made from the boiled roots is used as a diuretic[205].

nrakta E. Asia - China, Japan ksacta Meadows in high mountains, N. and C. Japan[58, 205]. Forests, forest margins, grassy slopes, stony places and roadsides at elevations of 500 - 2500 metres in China[266].

propta Seed - sow in the middle of spring in a greenhouse. Germination is usually fairly rapid and good. Prick out the seedlings into individual pots when they are large enough to handle. Grow the plants on for their first winter in a greenhouse and plant out in late spring[K]. Division in spring or after flowering in late summer or autumn[200]. Division is very quick and easy, succeeding at almost any time of the year[K]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Succeeds in most soils[1], including dry ones, preferring a rich moist soil and a sunny position[111] but tolerating partial shade[88]. Plants flower less freely in a shady position though the flowers can last longer in such a position[205]. Grows well in heavy clay soils. Succeeds in short grass if the soil is moist[1]. Prefers a pH between 6 and 7[200]. Hybridizes freely with other members of this genus[200]. Individual flowers only live for one day[205]. Plants take a year or two to become established after being moved but then form large clumps[200, 187]. The roots are fibrous without any obvious swellings[205]. Plants seem to be immune to the predations of rabbits[233]. The plants are very susceptible to slug and snail damage, the young growth in spring is especially at risk[200].

5.2.2 Tilia platyphyllos

Large Leaved Lime, Largeleaf linden, Bigleaf Linden

4 tlin 6 cyuc 5 kcaak 4 tcan 3 dwat 30 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Tilia platyphyllos is a deciduous Tree growing to 30 m (98ft) by 20 m (65ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to July, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista If the flowers used for making tea are too old, they may produce symptoms of narcotic intoxication[4].

kcakta Edible Parts: Leaves SapEdible Uses: Chocolate TeaYoung leaves - raw. A delicious addition to salads and sandwiches, the young leaves are mild and tender with a somewhat mucilaginous texture[K]. A very acceptable chocolate substitute can be made from a paste of the ground-up flowers and immature fruit. Trials on marketing the product failed because the paste is very apt to decompose[2, 115]. A popular herb tea is made from the flowers, it has a sweet, fragrant pleasant flavour. Some caution is advised, see notes above on toxicity. Sap - harvested in the spring, it is sweet and can be used as a drink or concentrated into a syrup[4].

tcanta Charcoal Fibre Paper WoodA fibre from the inner bark is used to make mats, shoes, baskets, ropes etc[1, 13, 14, 46, 61, 100]. It is also suitable for cloth[115]. It is harvested from trunks that are 15 - 30cm in diameter[115]. The fibre can also be used for making paper[189]. The stems are harvested in spring or summer, the leaves are removed and the stems steamed until the fibres can be stripped. The outer bark is removed from the inner bark by peeling or scraping. The fibres are cooked for 2 hours with lye and then beaten in a ball mill. The paper is beige in colour[189]. Wood - soft, white, easily carved. It is very suitable for carving domestic items and small non-durable items[4, 13, 46, 61, 115]. A charcoal made from the wood is used for drawing and has medicinal properties[7, 46, 61, 115].

dwatta Antispasmodic Diaphoretic Diuretic Expectorant Hypotensive Laxative SedativeLime flowers are a popular domestic remedy for a number of ailments, especially in the treatment of colds and other ailments where sweating is desirable[9]. A tea made from the fresh or dried flowers is antispasmodic, diaphoretic, expectorant, hypotensive, laxative and sedative[4, 9, 13, 226, 238]. Lime flower tea is also used internally in the treatment of indigestion, hypertension, hardening of the arteries, hysteria, nervous vomiting or palpitation[4, 238]. The flowers are harvested commercially and often sold in health shops etc[226]. Lime flowers are said to develop narcotic properties as they age and so they should only be harvested when freshly opened[238]. A charcoal made from the wood is used in the treatment of gastric or dyspeptic disturbances and is also made into a powder then applied to burns or sore places[4]. It is also quite an effective vasodilator[7].

nrakta Europe, from Britain and Belgium south and east to Spain, Crimea, Caucasus and W. Asia. ksacta Woods on good calcareous or base rich soils[17].

propta Seed - much of the seed produced in Britain is not viable, cut a few seedcases open to see if there is a seed inside[80]. If possible, obtain fresh seed that is ripe but has not as yet developed a hard seed coat and sow it immediately in a cold frame. It may germinate in the following spring though it could take 18 months[80]. Stored seed can be very slow to germinate. It has a hard seed coat, embryo dormancy and a hard coat on the pericarp. All these factors mean that the seed may take up to 8 years to germinate[80]. One way of shortening this time is to stratify the seed for 5 months at high temperatures (10°C at night, up to 30°C by day) and then 5 months cold stratification[80]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Layering in spring just before the leaves unfurl. Takes 1 - 3 years[78]. Suckers, when formed, can be removed with as much root as possible during the dormant season and replanted immediately[200].

nwatta Landscape Uses:Espalier, Pollard, Screen, Specimen. Prefers a good moist loamy alkaline to neutral soil but succeeds on slightly acid soils[11, 200]. Grows poorly on any very dry or very wet soils[200]. Succeds in sun or semi-shade[188]. Plants can be transplanted quite easily, even when quite large, trees up to 60 years old have been moved successfully[1, 74]. Lime trees are very long-lived[7] and are amenable to coppicing or pollarding. This species does not produce many suckers[98, 200]. Grows well in Britain, it is the only species that reliably produces viable seed in areas with cool summers[200]. Lime trees tend to hybridise freely if other members of the genus are growing nearby[238]. If growing plants from seed it is important to ensure the seed came from a wild source or from an isolated clump of the single species[K]. Grows best in a woodland situation, young

plants tolerate a reasonable level of side shade[200]. Mature trees cast a dense shade[186]. A very valuable bee plant, producing an abundance of nectar[7, 11, 125]. A valuable tree for wildlife, there are 31 species of insects associated with this tree[24]. A food plant for the caterpillars of many butterfly and moth species[30]. Trees are usually attacked by aphids which cover the ground and the leaves with a sticky honeydew[188]. There are some named varieties selected for their ornamental value[188]. Plants in this genus are notably resistant to honey fungus[200]. Special Features:Not North American native, Fragrant flowers, Attractive flowers or blooms.

5.2.3 Corylus maxima

Filbert, Giant filbert

4 tlin 8 cyuc 5 kcaak 5 tcan 0 dwat m hkucc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikli-wissliip hpa7tmwatli fyif hjonli

drutta Corylus maxima is a deciduous Shrub growing to 6 m (19ft) by 5 m (16ft). See above for USDA hardness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to May, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

kcakta Edible Parts: Oil Oil SeedEdible Uses: Milk Oil OilSeed - raw or cooked[22, 34, 46, 105]. It is rich in oil. Large and well flavoured, it can be eaten raw, cooked in cakes, pies, breads etc or used to make a plant milk[183]. The seed ripens in mid to late autumn and will probably need to be protected from squirrels[K]. When kept in a cool place, and not shelled, the seed should store for at least 12 months[K]. An edible oil is obtained from the seed.

tcanta Basketry Charcoal Hedge Hedge Oil Oil WoodThe seed contains up to 65% of a non-drying oil, used in paints, cosmetics etc[13, 46, 57, 132]. The whole seed can be used to polish and oil wood[6]. Very easy and effective[K]. Plants can be grown as a tall hedge[29]. They need to be left untrimmed or only lightly trimmed if seed is required. Wood - soft, easy to split, not very durable, beautifully veined. Used for inlay work, small items of furniture, hurdles, wattles, basketry, pea sticks etc[7, 13, 23, 46, 61, 63, 66, 125]. The twigs are used as dowling rods by water diviners[11]. The wood also yields a good quality charcoal, used by artists[63, 101].

nrakta S. Europe to W. Asia. ksacta Woods, hedges and ravines[100].

propta Seed - best sown as soon as it is harvested in autumn in a cold frame[164]. Germinates in late winter or spring. Stored seed should be pre-soaked in warm water for 48 hours and then given 2 weeks warm followed by 3 - 4 months cold stratification[164]. Germinates in 1 - 6 months at 20°C[164]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame or sheltered place outdoors for their first winter. Plant them out into their permanent positions in late spring or early summer[K]. Layering in autumn. Easy, it takes about 6 months[78, 200]. Division of suckers in early spring. Very easy, they can be planted out straight into their permanent positions.

nwatta Management: Coppice Management: Standard Regional Crop Staple Crop: Protein-oilAn easily grown plant, it succeeds in most soils, but is in general more productive of seeds when grown on soils of moderate fertility[11, 200]. It does less well in rich heavy soils or poor ones[11, 63]. Does well in a loamy soil[11]. Very suitable for an alkaline soil[11], but it dislikes very acid soils[17]. Plants are fairly wind tolerant[1, 11]. A very hardy plant but the male flowers can be damaged by heavy frosts at flowering time[200]. The filbert is often cultivated for its edible seeds[50], there are many named varieties[63]. It has often been hybridized with C. avellana in breeding programmes[11]. Plants are self-fertile but a more certain crop is obtained if more than one cultivar is grown[200]. The main difference between cob nuts and filberts is that the husk of a filbert is longer than the seed and often completely encloses

cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[183]. The fruit is usually blotted if it is going to be eaten raw[K]. This involves storing the fruit in a cool dry place until it is almost but not quite going rotten. At this stage the fruit has a delicious taste, somewhat like a luscious tropical fruit. The fruit is up to 1.5cm across[200] and is borne in bunches which makes harvesting easier[K].

nrakta Europe - France. ksacta Only found in the forest of Fontainebleau[11].

propta Seed - best sown as soon as it is ripe in a cold frame[78, 80]. If you have sufficient seed it can be sown in an outdoor seedbed[78, 80]. Stored seed germinates better if given 2 weeks warm then 14 - 16 weeks cold stratification[98], so sow it as early in the year as possible. Prick out the seedlings into individual pots when they are large enough to handle. Seedlings are very slow to put on top-growth for their first year or two[11], but they are busy building up a good root system. It is best to keep them in pots in a cold frame for their first winter and then plant them out into their permanent positions in late spring.

nwatta Succeeds in most reasonably good soils in an open sunny position[11]. Tolerates light shade[188], though it fruits better in a sunny position[K]. Plants are susceptible to fireblight[188]. Probably of hybrid origin with S. torminalis as one parent and S. aria or a species from that complex as the other parent[11]. The trees usually have apomictic flowers. They thus produce seed asexually, each seedling being a clone of the parent[11].

5.2.43 Akebia quinata

Akebia, Chocolate vine, Fiveleaf Akebia, Chocolate Vine

4 tlin 8 cyuc 4 kcaak 3 tcan 2 dwat 12 m hkucc
pcimhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli dyat hjonli

drutta Akebia quinata is a deciduous Climber growing to 12 m (39ft 4in) at a fast rate. See above for USDA hardness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to May, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: TeaFruit - raw[2, 105, 177]. Sweet but insipid[3]. The fruit has a delicate flavour and a soft, juicy texture[K]. Lemon juice is sometimes added to the fruit to enhance the flavour[183]. The bitter skin of the fruit is fried and eaten[183]. The fruit is 5 - 10cm long and up to 4m wide[200, 266]. Soft young shoots are used in salads or pickled[183]. The leaves are used as a tea substitute[105, 177, 183].

tcanta BasketryThe peeled stems are very pliable and can be used in basket making[174]. Plants have sometimes been used as a ground cover, but their method of growth does not really lend themselves to this use[208]. Scented. Landscape Uses: Arbor.

dwatta Anodyne Antiphlogistic Bitter Cancer Contraceptive Depurative Diaphoretic Diuretic Emmenagogue Fibrifuge Galactagogue Laxative Resolvent Stimulant Stomachic Urinary VulneraryThe stems are anodyne, antifungal, antiphlogistic, bitter, diaphoretic, diuretic, emmenagogue, fibrifuge, laxative, galactagogue, resolvent, stimulant, stomachic and vulnerary[174, 178, 218, 238]. Taken internally, it controls bacterial and fungal infections and is used in the treatment of urinary tract infections, lack of menstruation, to improve lactation etc[238]. The stems are harvested in the autumn and dried for later use[238]. The fruit is antirheumatic, depurative, diuretic, fibrifuge, stomachic and tonic[218]. It is a popular remedy for cancer[218]. The root is fibrifuge[218]. The plant was ranked 13th in a survey of 250 potential antifertility plants in China[218].

nrakta E. Asia - China, Japan, Korea. ksacta Woods, hedges and thickets in mountainous areas[58]. Forest remnants along streams, scrub on mountain slopes at elevations of 300 - 1500 metres in China[266].

propta Seed - best sown in a cold frame as soon as it is ripe. Surface sow in a light position[133]. The seed usually germinates in 1 - 3 months at 15°C[133]. Stored seed should be given 1 month cold stratification[113, 133] and can be very difficult to germinate. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for at least their first winter. Plant out in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame[11, 113]. The cuttings can be slow to root[200]. Cuttings can also be taken of soft wood in spring[113]. Root cuttings, December in a warm greenhouse[113]. Layering in early spring[11]. Very easy, the plants usually self-layer and so all you need to do is dig up the new plants and plant them out directly into their permanent positions.

nwatta Requires a well-drained moisture retentive soil[200]. Prefers a good loamy soil[11]. Succeeds in acid or alkaline soils[200]. Prefers partial shade but succeeds in full sun[3, 200]. Succeeds on north facing walls[219]. Plants are fast growing and can be invasive[200]. Dormant plants are hardy to about -20°C but they can be somewhat tender when young[200]. The young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. This species grows very well in S.W. England[11]. Plants are evergreen in mild winters[11]. Resentful of root disturbance, either grow the plants in containers prior to planting them out or plant them out whilst very young[219]. Plants are not normally pruned, if they are growing too large they can be cut back by trimming them with shears in early spring[202]. The flowers have a spicy fragrance, reminiscent of vanilla[219]. Plants are shy to fruit, they possibly require some protection in the flowering season, hand pollination is advisable[3, 11]. Plants are probably self-sterile[11, 182], if possible at least 2 plants should be grown, each from a different source. Plants in this genus are notably resistant to honey fungus[200]. Special Features: Not North American native, Fragrant flowers, Attractive flowers or blooms. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out. The root pattern is suckering with new plants from underground runners away from the plant [2-1].

5.2.44 Crataegus holmesiana

Holmes' hawthorn

4 tlin 8 cyuc 4 kcaak 0 tcan 2 dwat 10 m hkucc
hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatprikliwissliip hpa7tmwatli xre7t hjonli

drutta Crataegus holmesiana is a deciduous Tree growing to 10 m (32ft) by 8 m (26ft). See above for USDA hardness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. An excellent dessert fruit, it has an acid yet sweet flavour, is juicy but with a mealy texture, it makes very pleasant eating[K]. Some forms have fruits with a disagreeable flavour[82]. The fruit can also be used in making pies, preserves etc, and can be dried for later use. The fruit is about 10mm in diameter[200]. A specimen at Cambridge Botanical garden has fruits up to 20mm in diameter[K]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiac HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as

to contain 87.5 g water, 1.5 g protein, 0.49 g fat, 8.3 g carbohydrates, 1.4 g fiber, 0.9 g ash, 80 mg Ca, 40 mg P, 1.9 mg Fe, 174 IU vit. A, 9 ?g thiamine, 184 µg riboflavin, 0.8 mg nicotinic acid, and 13 mg ascorbic acid. Young leaves and shoots - cooked[105, 183]. A famine food, used when all else fails[177]. The leaf makes a good vegetable, it is rich in carotene and calcium[179]. Protein preparations from young mulberry leaves form an excellent supplement to protein-deficient diets[269]. The dry leaves contain 18 - 28.8% protein, 0.2 - 0.7% Magnesium, 0.8 - 13.6% soluble sugars, 0.6 - 1.4% phosphorus, 2 - 3.9% potassium, 1.4 - 2.4% calcium, 0.8 - 1.8% aluminium, 0.05 - 0.26% iron, 1.8 - 2.6% silica, and 0.3 - 0.56% sulphur[269]. The leaf also contains 10% tannin[179]. Inner bark - roasted and ground into a meal then used as a thickener in soups etc or mixed with cereals when making bread. A famine food, used when all else fails[179]. The tree is said to be a source of an edible manna[183]. Young shoots can be used as a tea substitute[183].

tcanta Biomass Dye Fibre Fodder Shelterbelt Tannin WoodA fibre is obtained from the bark of one-year old stems, it is used in weaving clothes etc[7, 74, 266]. The stem bark is fibrous and is used in China and Europe for paper making[266, 269]. The twigs are used as binding material and for making baskets[269]. A brown dye is obtained from the trunk[178]. The leaves contain 10% tannin[179]. This tree can be grown as a part of a shelterbelt. The cultivar 'Tatarica' has been especially mentioned[200], it is very suitable for northern latitudes and is much used as a shelterbelt in Russia[269]. The wood of the mulberry is a potentially excellent source of ethanol, with yields of up to 6% from sawdust treated with acid and then given four days incubation[269]. Wood - light to moderately heavy, hard, durable, fine and close-grained, though it shows a tendency to warp. Due to its elasticity and flexibility when steamed, it is valued for making sports equipment such as tennis rackets and cricket bats, being considered as good as ash (Fraxinus excelsior)[238, 269]. It is also used for boat building, furniture, agricultural implements etc[145, 149, 158, 269]. It furnishes a medium grade fuel wood[269].

dwatta Analgesic Anthelmintic Antiatshmatic Antibacterial Antirheumatic Antitussive Astringent Diaphoretic Diuretic Emollient Expectorant Hypoglycaemic Hypotensive Odontalgic Ophthalmic Pectoral Purgative Sedative Tonic UrinaryThe white mulberry has a long history of medicinal use in Chinese medicine, almost all parts of the plant are used in one way or another[238]. Recent research has shown improvements in elephantiasis when treated with leaf extract injections and in tetanus following oral doses of the sap mixed with sugar[238]. The leaves are antibacterial, astringent, diaphoretic, hypoglycaemic, odontalgic and ophthalmic[176, 218, 238]. They are taken internally in the treatment of colds, influenza, eye infections and nose-bleeds[176, 238]. An injected extract of the leaves can be used in the treatment of elephantiasis and purulent fistulae[176]. The leaves are collected after the first frosts of autumn and can be used fresh but are generally dried[238]. The stems are antirheumatic, antispasmodic, diuretic, hypotensive and pectoral[176, 218, 238]. They are used in the treatment of rheumatic pains and spasms, especially of the upper half of the body, high blood pressure[176]. A tincture of the bark is used to relieve toothache[7]. The branches are harvested in late spring or early summer and are dried for later use[238]. The fruit has a tonic effect on kidney energy[218, 238]. It is used in the treatment of urinary incontinence, dizziness, tinnitus, insomnia due to anaemia, neurasthenia, hypertension, diabetes, premature greying of the hair and constipation in the elderly[176, 238]. The root bark is antiasthmatic, antitussive, diuretic, expectorant, hypotensive and sedative[176, 238]. It is used internally in the treatment of asthma, coughs, bronchitis, oedema, hypertension and diabetes[176, 238]. The roots are harvested in the winter and dried for later use[238]. The bark is anthelmintic and purgative, it is used to expel tape worms[240]. Extracts of the plant have antibacterial and fungicidal activity[218].

nrakta E. Asia - central and northern China. ksacta Not known in a truly wild situation.

propta The seed germinates best if given 2 - 3 months cold stratification[80, 98]. Sow the seed as soon as it is ripe if possible, otherwise in February in a cold frame. The seed usually germinates in the first spring, though it sometimes takes another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them

on in the cold frame for their first winter. Plant them out in late spring or early summer after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame. Plant out in spring. A good percentage take, though they sometimes fail to thrive[78, 113]. Cuttings of mature wood of the current season's growth, 25 - 30cm with a heel of 2 year old wood, autumn or early spring in a cold frame or a shady bed outside[78, 113, 200]. Bury the cuttings to threequarters of their depth. Layering in autumn[200].

nwatta Agroforestry Services: Contour hedgerow Agroforestry Services: Living fence Fodder: Bank Fodder: Insect Industrial Crop: Biomass Management: Coppice Management: Standard Minor Global Crop Other Systems: Dyke-pondLandscape Uses:Pest tolerant, Aggressive surface roots possible, Pollard. Succeeds in a variety of soils[269], though it prefers a warm well-drained loamy soil in a sunny position[1, 11]. Plants are fairly wind-resistant[200], though the branches are often killed back when growing in strong maritime exposure[K]. At least some cultivars are drought resistant, the form 'Tatarica' has been especially mentioned[183]. The white mulberry is occasionally cultivated for its edible fruit, there are a number of varieties[183] and sub-species varying greatly in the quality of their fruit. The form M. alba multicaulis. (Perretot.)Loud. (synonym M. multicaulis. Perretot.) has been specially mentioned for its fruit[105]. The cultivars 'Nana' and 'Fegyvernekiana' are dwarf forms only making shrub size[182]. The cultivar 'Pendulum' was seen growing at Kew in July 1994 with a heavy crop of tasty fruits, the first of which were just ripening[K]. Mulberries have brittle roots and so need to be handled with care when planting them out[238]. Any pruning should only be carried out in the winter when the plant is fully dormant because mulberries bleed badly when cut[238]. Ideally prune only badly placed branches and dead wood[238]. This is a good tree for growing grapes into[20]. The grapes are difficult to pick but always seem to be healthier and free from fungal diseases[201]. Plants in this genus are notably resistant to honey fungus[200]. Special Features:Not North American native, Naturalizing, There are no flowers or blooms. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2].

5.2.42 Sorbus latifolia

French Hales

4 tlin 8 cyuc 4 kcaak 0 tcan 0 dwat 14 m hkuc hmimhtut cyulti tcup hwicli hrasjlutnyik hpa7tli fatprikliw hpa7tmwatli fyifxre7t hjonli

drutta Sorbus latifolia is a deciduous Tree growing to 14 m (46ft) by 10 m (32ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects, Apomictic (reproduce by seeds formed without sexual fusion). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

pcista The seeds probably contain hydrogen cyanide. This is the ingredient that gives almonds their characteristic flavour. Unless the seed is very bitter it should be perfectly safe in reasonable quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of

it, whilst the husk on a cob nut is shorter than the seed[200]. Squirrels are a major pest of this plant, often decimating the crop of nuts[200]. Members of this genus bear transplanting well and can be easily moved even when relatively large[11].

5.2.4 Hemerocallis middendorffii

Amur daylily, Middendorf, Daylily

4 tlin 8 cyuc 5 kcaak 2 tcan 1 dwat m hkuc hmimhtut cyulti kyucutcp hwicli hrasjlutnyikfrip hpa7tli fatprikliw hpa7tmwatli xre7t hjonli

drutta Hemerocallis middendorffii is a PERENNIAL growing to 0.9 m (3ft) by 0.5 m (1ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to July. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Large quantities of the leaves are said to be hallucinogenic. Blanching the leaves removes this hallucinatory component[205]. (This report does not make clear what it means by blanching, it could be excluding light from the growing shoots or immersing in boiling water[K].)

kcakta Edible Parts: Flowers Leaves ShootsEdible Uses: Leaves and young shoots - cooked[105, 116, 177, 183]. They must be consumed when very young or else they become fibrous[K]. Flowers and flower buds - raw or cooked[105, 177, 183]. The flowers can be dried and used as a thickener in soups etc. The flower buds contain about 43mg vitamin C per 100g, 983 IU vitamin A and 3.1% protein[205].

tcanta WeavingThe tough dried foliage is plaited into cord and used for making footwear[205]. Plants form a spreading clump and are suitable for ground cover when spaced about 45cm apart each way[208]. The dead leaves should be left on the ground in the winter to ensure effective cover[208]. (This report was for a plant labelled H. middendorffiana, which I have assumed is a mis-spelling of this species[K]). Attractive flowers.

dwatta Antidote Diuretic Vitamin CThe juice of the roots is an effective antidote in cases of arsenic poisoning[205]. A tea made from the boiled roots is used as a diuretic[205].

nrakta E. Asia - China, Japan, Korea. ksacta Meadows in high mountains of N. Japan[58]. Forests, forest margins, meadows and wet grasslands from near sea level to 2000 metres in China[266].

propta Seed - sow in the middle of spring in a greenhouse. Germination is usually fairly rapid and good. Prick out the seedlings into individual pots when they are large enough to handle. Grow the plants on for their first winter in a greenhouse and plant out in late spring[K]. Division in spring or after flowering in late summer or autumn[200]. Division is very quick and easy, succeeding at almost any time of the year[K]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Landscape Uses:Border, Container, Ground cover, Massing, Seashore. Succeeds in most soils[1], including dry ones, preferring a rich moist soil and a sunny position[111] but tolerating partial shade[88]. Plants flower less freely in a shady position though the flowers can last longer in such a position[205]. Grows well in heavy clay soils. Succeeds in short grass if the soil is moist[1]. Prefers a pH between 6 and 7[200]. Hybridizes freely with other members of this genus[200]. Individual flowers are short-lived, but the plant produces a succession of blooms and also flowers again in late summer[205]. The plant has a fibrous root system that does not extend far[205]. Plants take a year or two to become established after being moved but then form large clumps[200, 187]. Plants seem to be immune to the predations of rabbits[233]. The plants are very susceptible to slug and snail damage, the young growth in spring is especially at risk[200]. Special Features: Attractive foliage, Not North American native, Naturalizing, Attracts butterflies, Suitable for cut flowers, Fragrant flowers.

5.2.5 Crataegus missouriensis

4 tlin 8 cyuc 5 kcaak 0 tcan 2 dwat m hkuc hmimhtut cyulti hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli fatprikliw hpa7tmwatli xre7t hjonli

drutta Crataegus missouriensis is a deciduous Tree growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. The seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. The size of a large cherry, the flesh is sweet, soft and fairly juicy[K]. The fruit is only about 10mm thick according to another report[235]. The fruit ripens in mid to late September in southern Britain[K], it makes a delicious dessert fruit and can also be used in making pies, preserves etc[K]. The fruit can be dried for later use. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta South-eastern N. America - Virginia to North Carolina and Missouri. ksacta Rocky bluffs and river banks[235].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. This species has a good potential as a fruit crop in Britain. It regularly produces heavy crops of high quality, the tree is very easily grown and is little troubled by pests or diseases. It also requires very little attention, once the trees are established virtually the only work needed is to harvest the fruit each year[K]. A plant growing at Hillier Arboretum was about 3 metres tall (with a trunk 2 metres long) and 3 metres wide, it was fruiting well in 1993 and 1994[K]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before

they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

5.2.6 Quercus ilex

Holly Oak, Evergreen Oak
4 tin 10 cyuc 5 kcaak 3 tcan 2 dwat 25 m hku
hmimhtut cyutli tcup hwicli hrasljutnykfrp hpa7tli flatprikli-wissliphom hpa7tmwatli hjonli

drutta Quercus ilex is an evergreen Tree growing to 25 m (82ft) by 20 m (65ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from May to June, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline and saline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Oil SeedEdible Uses: Coffee OilSeed - raw or cooked[1, 2, 46, 61]. It can be sweet or bitter[K]. The seed is up to 3cm long[200], it can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed from some trees contains bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute. An edible oil is obtained from the seed[183]. One reader noted the Q. suber population of the Mamora forest in Morocco contains only sweet acorns and can be eaten raw, it has a similar taste to raw chestnuts. The skin removes quite easily Quercus ilex also exists with tannin-free acorns in the Moroccan forests, the locals say around 20 percent are sweet.

tcanta Fodder Fuel Hedge Oil Repellent Shelterbelt Tannin WoodLandscape Uses: Specimen, Street tree. A mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. Very tolerant of maritime exposure and of trimming, it can be grown as a shelterbelt tree or hedge in maritime areas[11, 29, 49, 75]. Wood - strong, hard, durable. Used for furniture[46, 61, 89]. It makes a good charcoal[89] and a good fuel, burning well even if green[146]. The bark is a source of tannin[146]. Heat Zone: 9-2.

dwatta Astringent DysenteryAny galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta Europe - Mediterranean. Occasionally naturalized in Britain in S. England[17]. ksacta Arid places, maquis, woods and hills on limestone[89].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left

in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Fodder: Mast Industrial Crop: Tannin Management: Standard Other Systems: Dehesa Regional Crop Staple Crop: Balanced carbPrefers a good deep fertile loam which can be on the stiff side[11]. Thrives on shallow chalky soils[188]. Succeeds in all soils except those that are cold and poorly drained[98]. Grows well in sandy soils[188]. Young plants tolerate reasonable levels of side shade[200]. Very resistant to maritime exposure[11, 49, 75]. A very ornamental tree[1] but it is quite slow-growing[75]. Transplants badly unless moved regularly and this should be done as growth commences in late May or in September[11]. Fruits very freely in Britain[K]. The seed ripens in its first year[200]. The sub-species Q. ilex ballota is cultivated for its sweet-tasting edible seed in Portugal and Spain[K]. Hybridizes freely with other members of the genus[200]. This species is notably resistant to honey fungus[88, 200]. Special Features: Not North American native, Inconspicuous flowers or blooms. The plant is heat tolerant in zones 9 through 2. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2].

5.2.7 Corylus hybrids

Hybrid and Neohybrids, Hazel, Filbert
4 tin 9 cyuc 5 kcaak 5 tcan 2 dwat 25 m hku
hmimhtut cyutli tcup hwicli hrasljutnyk hpa7tli frusflatprikli-wissliphom hpa7tmwatli hjonli

drutta Corylus hybrids is a deciduous Shrub growing to 25 m (82ft) by 20 m (65ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

kcakta Carbon Farming Solutions - Staple Crop: protein-oil (The term staple crop typically refers to a food that is eaten routinely and accounts for a dominant part of people's diets in a particular region of the world). Hazelnuts are among the best perennial protein and oil staple crops for temperate and boreal climates. Hybrids and neohybrid hazels are of increasing importance [1-1].

tcanta Carbon Farming Solutions - Other Systems: woody agriculture. See individual species.

dwatta See individual species.

nrakta Hybrid ksacta Native to the temperate Northern Hemisphere. See individual species.

propta Seed - best sown as soon as it is harvested in autumn in a cold frame[164]. Germinates in late winter or spring. Stored seed should be pre-soaked in warm water for 48 hours and then given 2 weeks warm followed by 3 - 4 months cold stratification[164]. Germinates in 1 - 6 months at 20°C[164]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame or sheltered place outdoors for their first winter. Plant them out into their permanent positions in late spring or early summer[K]. Layering in autumn. Easy, it takes about 6 months[78, 200]. Division of suckers in early spring. Very easy, they can be planted out straight into their permanent positions.

nwatta Climate: boreal to warm temperate, Mediterranean. Humidity: semi-arid to humid. Carbon Farming Solutions - Cultivation: new crop. Management: standard, coppice (Describes the non-destructive management systems that are used in cultivation) [1-1].

propta Seed - best sown outdoors or in a cold frame as soon as it is ripe[11, 80]. The seed germinates almost immediately and must be given protection from severe weather[130]. The seed has a very limited viability and must not be allowed to dry out. Stored seed should be soaked for 24 hours prior to sowing and even after this may still not be viable[80, 113]. It is best to sow the seed with its 'scar' downwards[130]. If sowing the seed in a cold frame, pot up the seedlings in early spring and plant them out into their permanent positions in the summer.

nwatta Landscape Uses:Pest tolerant, Pollard, Specimen. Prefers a deep loamy well-drained soil but is not too fussy[1, 11]. Grows best in eastern and south-eastern areas of England probably needing a continental climate in order to thrive[126, 200]. Although the trees are very hardy when dormant, the new growth can be damaged by late spring frosts[11]. Plants grow well in a woodland situation, tolerating shading by larger trees[229]. Seedlings grow away quickly, the plants reaching maturity when about 60 - 80 years old[229]. The form *Asculus flava vestita* (Sarg.)Fern. is growing well at Kew Gardens. It has been seen with large crops of fruit on a number of occasions, even in cooler summers. These fruits have only been tried when immature (harvested at the end of August) but were then very tasty with no bitterness[K]. Fruits are produced more abundantly in warm summers[130]. Most members of this genus transplant easily, even when fairly large[11]. Special Features:Attractive foliage, North American native, Blooms are very showy.

5.2.40 Juglans ailanthifolia cordiformis

Heartseed Walnut
4 tin 8 cyuc 4 kcaak 4 tcan 1 dwat 20 m hku
htut cyutli tcup hwicli hrasljutnyk hpa7tli flatprikliwis hpa7tmwatli fyif hjonli

drutta Juglans ailanthifolia cordiformis is a deciduous Tree growing to 20 m (65ft) by 15 m (49ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in June. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Leaves Oil SeedEdible Uses: OilSeed - raw or cooked[183]. They are also used in sweets, pies etc[183]. A mild and pleasant flavour, they can be eaten in quantity for dessert[183]. The shell is thin and easily cracked[117]. It is considered to be superior in taste to *C. ailanthifolia*. An edible oil is obtained from the seed[183], though it tends to go rancid quickly. Young buds (leaf?) and peduncles - cooked[105, 177].

tcanta Dye Herbicide Oil Tannin WoodA brown dye is obtained from the seed husks and the bark[61]. Rich in tannin, it does not require a mordant. The bark is rich in tannin. It is used as a dye and also medicinally[178]. Plants produce chemicals which can inhibit the growth of other plants. These chemicals are dissolved out of the leaves when it rains and are washed down to the ground below, reducing the growth of plants under the tree[18, 20, 159]. The roots of many members of this genus produce substances that are toxic to many plant species, especially apples (*Malus* species), members of the Ericaceae, *Potentilla* spp and the white pines (certain *Pinus* spp.)[200]. Wood - soft, light, not easily cracked, of good quality. Used for cabinet making etc[46, 61].

dwatta Anthelmintic Astringent Diuretic Kidney Lithotropic Pectoral Skin TonicThe bark is anthelmintic, astringent, diuretic, lithotropic, pectoral, skin, tonic (kidneys)[178].

nrakta E. Asia - Japan. ksacta Forests[11].

propta The seed is best sown as soon as it is ripe in individual deep pots in a cold frame[80]. You need to protect it from mice, birds, squirrels etc. The seed usually germinates in late winter or the spring. Plant out the seedlings into their permanent positions in early summer and give some protection from the cold for their first winter or two. The seed can

also be stored in cool moist conditions (such as the salad compartment of a fridge) over the winter and sown in early spring but it may then require a period of cold stratification before it will germinate[78, 80].

nwatta Management: Standard Other Systems: Strip intercrop Regional Crop Staple Crop: Protein-oilRequires a deep well-drained loam and a sunny position sheltered from strong winds[1, 11]. Prefers a slightly alkaline soil[200]. This is the hardest member of the genus[63], it should succeed outdoors in most parts of the country. It is also resistant to most insects[160]. The young growth in spring, however, can be damaged by late frosts. This is a form of *C. ailanthifolia* with a thinner shell and a better tasting nut. It is cultivated for its edible seed in Japan and has the potential for producing very superior nuts, especially if hybridized with *J. cinerea*[117, 160]. There are some named varieties[183]. Plants can come into bearing in 3 - 4 years from seed[63]. Even when grown on a very windy site in Cornwall, the plants flowered in their eighth year from seed (by which time they were more sheltered from the wind)[K] Plants produce a deep taproot and they are intolerant of root disturbance[1, 11]. Seedlings should be planted out into their permanent positions as soon as possible and then given some protection since they are somewhat tender when young[1, 11]. Flower initiation depends upon suitable conditions in the previous summer[200]. The flowers and young growths can be destroyed by even short periods down to -2°C, but fortunately plants are usually late coming into leaf[200]. Any pruning should only be carried out in late summer to early autumn or when the plant is fully dormant otherwise wounds will bleed profusely and this will severely weaken the tree[200]. Trees have a dense canopy which tends to reduce plant growth below them[K]. We have no specific information for this species, but the roots of several members of this genus produce substances that are toxic to many plant species, especially apples (*Malus* species), members of the Ericaceae, *Potentilla* spp and the white pines (certain *Pinus* spp.)[200]. The leaves of many species also secrete substances that have an inhibitory affect on plants growing underneath them. All in all this is not a very good companion plant[K]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

5.2.41 Morus alba

White Mulberry, Common Mulberry,
4 tin 9 cyuc 4 kcaak 4 tcan 3 dwat 18 m hku
hmimhtut cyutli hgattcup hwicli hrasljutnyk hpa7tli flatprikliwis hpa7tmwatli fyif hjonli

drutta Morus alba is a deciduous Tree growing to 18 m (59ft) by 10 m (32ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in May, and the seeds ripen from July to August. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure.

pcista One report suggests that the raw fruit contains hallucinogens[62]. This fruit is frequently eaten in various parts of the world, there are even some named varieties, and no such effects have been mentioned elsewhere, nor observed by the writer when he has eaten the fruit. Possibly the unripe fruit was being referred to in the report, though even this would be surprising[K].

kcakta Edible Parts: Fruit Inner bark Leaves Manna ShootsEdible Uses: TeaFruit - raw[2, 7, 158]. A sweet taste, but the fruit is usually insipid[3, 11]. It contains about 1.5% protein, 0.5% fat, 8% carbohydrate, 0.7% malic acid[179]. Fruits of the cultivar 'Pendulum' tried at Kew in July 1994 had a pleasant flavour[K]. A richer flavour develops if the fruit is dried, it can then be used as a raisin substitute. The fruit is up to 25mm long[200]. Some caution is advised, see the notes above on toxicity. Per 100 g, the fruit is reported

5.2.38 Quercus prinus

Rock Chestnut Oak
4 tin 8 cyuc 4 kcaak 3 tcan 2 dwat 20 m hkuc
hmimhtut cyutli tcup hwicli jlutnyik hpa7tli flatprikliwis
hpa7tmwatli hjonli

drutta Quercus prinus is a deciduous Tree growing to 20 m (65ft 7in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in May, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: CoffeeSeed - raw or cooked[2, 46, 83, 159]. Somewhat sweet according to some reports[62, 82, 95, 229, 235] whilst another says that it contains bitter tannin[183]. The seed is quite large, up to 4cm long and 25mm wide[82, 200]. It can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread[183]. If the seed contains bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute.

tcanta Buttons Dye Repellent Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. The seed cups are used as buttons[95]. The bark is a commercial source of tannin[46, 223]. On a 10% moisture basis, the bark contains 9.7% tannin[223]. Tannin is also found in the leaves and wood[223]. Oak galls are excrecences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. A red dye is obtained from the bark[4]. Tan-coloured according to another report[257]. Wood - close-grained, heavy, hard, rather tough, strong, durable in contact with the soil[46, 61, 82, 229]. It weighs 47lb per cubic foot[235]. Used commercially like Q. alba, it is used for furniture, cabinet making, interior finishes, fence posts and fuel[46, 61, 229].

dwatta Astringent DysenteryAny galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta Eastern N. America - Maine to Georgia and Alabama. ksacta Dry or rocky woods, mainly on siliceous soils[43] and on the borders of streams[82]. The best specimens are found on deep rich well-drained soils[229].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Young plants tolerate reasonable levels of shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. Prefers warmer summers than are usually experienced in Britain[200], but trees still grow well in this country[1]. A slow-growing tree in the wild, though it can live 400 years[229]. The tree produces large crops of acorns every 4 - 7 years, with small crops in the intervening years[229]. The tree flowers on new growth produced in spring, the seed ripening in its first year[200, 229]. This species is often confused with Q. michauxii, Q.

muehlenbergii and Q. prinoides[200]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. Hybridizes freely with other members of the genus[200]. This species is notably resistant to honey fungus[88, 200]. The plant is heat tolerant in zones 8 through 3. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. The root pattern is a heart root, dividing from the crown into several primary roots going down and out [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

5.2.39 Aesculus flava

Sweet Buckeye, Yellow buckeye
4 tin 8 cyuc 4 kcaak 0 tcan 0 dwat 20 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis
hpa7tmwatli xre7t hjonli

drutta Aesculus flava is a deciduous Tree growing to 20 m (65ft) by 8 m (26ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to June, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The seed is rich in saponins. Although poisonous, saponins are poorly absorbed by the human body and so most pass through without harm. Saponins are quite bitter and can be found in many common foods such as some beans. They can be removed by carefully leaching the seed or flour in running water. Thorough cooking, and perhaps changing the cooking water once, will also normally remove most of them. However, it is not advisable to eat large quantities of food that contain saponins. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K].

kcakta Edible Parts: Nectar SeedEdible Uses: Seed - cooked. Said to be as sweet as a chestnut[105, 177]. We have only eaten the immature seed, harvested in late August, but these were very tasty with no noticeable bitterness[K]. The seed can be up to 45mm in diameter and is easily harvested[82]. It can be dried, ground into a flour and used as a gruel. The seed contains saponins and needs to be leached of these toxins before it becomes safe to eat - the North American Indians would do this by slow-roasting the nuts (which would have rendered the saponins harmless) and then cutting them into thin slices, putting them into a cloth bag and rinsing them in a stream for 2 - 5 days[213, 229]. The resulting product is said to be tasty and nutritious[229], though most of the minerals etc would have been leached out[K]. The flowers contain a sweet nectar which is delicious when sucked out[245].

tcanta Soap WoodSaponins in the seed are used as a soap substitute[169]. The saponins can be easily obtained by chopping the seed into small pieces and infusing them in hot water. This water can then be used for washing the body, clothes etc. Its main drawback is a lingering odour of horse chestnuts[K]. Wood - very soft, light, close grained, difficult to split. It weighs 27lb per cubic foot[235]. It is used for making artificial limbs, wooden ware, pulp etc, and is occasionally sawn into lumber[46, 62, 82, 171].

nrakta Eastern N. America - Pennsylvania to Tennessee and west to Ohio. ksacta Rich river-bottoms and mountain slopes[82]. Woodland on moist rich soils[43]

5.2.8 Diospyros virginiana

American Persimmon, Common persimmon, Persimmon
4 tin 8 cyuc 5 kcaak 3 tcan 1 dwat 20 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis
hpa7tmwatli nyanhjen hjonli

drutta Diospyros virginiana is a deciduous Tree growing to 20 m (65ft 7in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in June, and the seeds ripen from October to November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Insects, wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit OilEdible Uses: Coffee Oil Sweetener TeaFruit - raw, cooked or dried and used in breads, cakes, pies, puddings etc[46, 183]. About the size of a plum, the fruit has an exquisitely rich flavour when it is fully ripe (and almost at the point of going bad) but it is very harsh and astringent before then[2, 3, 171, K]. The fruit may not ripen properly in a cool summer, though if it is frosted it normally develops a very good flavour[K]. The fruit can also be harvested in the autumn, preferably after a frost, and bletted. (This is a process where the fruit is kept in a cool place and only eaten when it is very soft and almost at the point of going rotten.) Much of the fruit on trees in a relatively sunny position at Kew after a relatively warm summer in 1996 was still not fully ripe, though it was very nearly so and ripened well off the tree[K]. The fruit can also be dried and used in bread, cakes etc. The fruit is up to 4.5cm in diameter[200]. Molasses can be made from the fruit pulp[183]. An oil obtained from the seeds is said to taste like peanut oil[222]. A tea is made from the dried leaves[102]. It is high in vitamin C and has a pleasant flavour somewhat like sassafras[21, 183]. The roasted seed is used as a coffee substitute[177, 183].

tcanta Oil Soil stabilization WoodCan be used as a root-stock for D. kaki[46]. Wood - strong, hard, heavy, fine-grained, elastic, resistant to wear. A valuable wood, it is used for making wooden ware, turnery etc[46, 82, 149, 171]. It is used especially for making handles for golf clubs[149].

dwatta Antiscorbutic Astringent Vitamin C WartsA decoction of the boiled fruit was used to treat bloody stools[213]. (This probably refers to the unripe fruit, which is very astringent[K]). The leaves are rich in vitamin C and are used as an antiscorbutic[213]. A decoction of the inner-bark is highly astringent[149, 222]. It has been used as a mouth rinse in the treatment of thrush and sore throats[213, 222]. Used externally as a wash for warts or cancers[222].

nrakta Eastern N. America - New England to Florida, west to Texas and Kansas. ksacta Dry woods, old fields and clearings[43], on light well-drained sandy soils[82]. Found on most soil types from sands to shales and mud bottomlands[149].

propta Seed - best sown in a cold frame as soon as it is ripe[113, 200]. Stored seed requires cold-stratification and should be sown as early in the year as possible[78]. It usually germinates in 1 - 6 months at 15°C[175]. Pot up the young seedlings as soon as they are large enough to handle into fairly deep pots and plant them out in early summer. Give the plants some protection from winter cold for their first winter or two outdoors. Cuttings of half-ripe wood, July/August in a frame[200]. Layering in spring[200].

nwatta Requires a good deep loamy soil in sun or light shade[200]. If being grown for its fruit, the tree requires a warm, sunny, sheltered position[K]. It dislikes very acid or wet and poorly drained soils[200]. Plants are somewhat tender when young[11], though dormant mature trees are hardy to about -35°C[160]. The young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. Dioecious, but the female tree can produce seedless fruits in the absence of a pollinator[1]. It is likely that unfertilized fruits are more astringent than fertilized fruits since this is the case with D. kaki[K]. Trees can start producing fruit when only a few years old, a specimen seen at Kew Botanical gardens in autumn 1996 was only 1.5 metres tall and was bearing a very large crop of fruit[K]. This species is occasion-

ally cultivated for its edible fruit, there are several named varieties[82, 183]. 'Dooley' grows well near the northern limits of persimmon culture[183]. 'Geneva Red' also grows well at the northern limits of persimmon culture. The fruit is medium to large[183]. 'Meader' grows well in cooler areas, it is self-fertile[183]. Plants have a long tap root and are difficult to transplant[149, 200], it is best to plant them out in their permanent position as soon as possible and to give protection overwinter for the first year or two[K]. The ssp. D. virginiana platycarpa has sweet succulent flesh, it grows wild from Missouri to Arkansas[82]. Special Features: Attracts birds, North American native, Attracts butterflies, Inconspicuous flowers or blooms. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A sprouting standard sending up shoots from the base [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

5.2.9 Actinidia arguta

Tara Vine
4 tin 8 cyuc 5 kcaak 2 tcan 0 dwat 15 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis
hpa7tmwatli nyanhjen hjonli

drutta Actinidia arguta is a deciduous Climber growing to 15 m (49ft 3in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in leaf from May to November, in flower from June to July, and the seeds ripen in October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Bees, insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit SapEdible Uses: Fruit - raw, cooked or dried for later use[1, 3, 61, 105]. Sweeter than A. deliciosa, the kiwi fruit[183], the skin is smooth and can be eaten with the fruit[K]. The fruit contains up to 5 times the vitamin C content of blackcurrants[74]. Highly esteemed according to one report[151] whilst another says that they are insipid[11]. The fruits are greenish-yellow or purple-red when mature and are about 2 to 3cm long[198, 266]. They contain a number of small seeds, but these are easily eaten with the fruit[K]. The plant is rich in sap and this can be tapped and drunk in the spring[105, 177, 183].

nrakta E. Asia - China, Japan ksacta Climbing up trees in woodland, mountain forests, thickets, streamside and moist places at elevations of 700 - 3600 metres[11, 198, 266].

propta Seed - sow spring in a greenhouse[133]. It is probably best if the seed is given 3 months stratification[113], either sow it in a cold frame as soon as it is ripe in November or as soon as it is received. Fresh seed germinates in 2 - 3 months at 10°C, stored seed can take longer[133]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for at least their first winter. When the plants are 30cm or more tall, plant them out into their permanent positions in late spring or early summer, after the last expected frosts[K]. Most seedlings are male[126]. The seedlings are subject to damping off, so they must be kept well ventilated[113]. Cuttings of softwood as soon as ready in spring in a frame[K]. Cuttings of half-ripe wood, July/August in a frame. Very high percentage[113]. Cuttings of ripe wood, October/November in a frame.

nwatta Prefers a sound loamy neutral soil[1, 200]. Tolerates acid and moderately alkaline soils[202]. Succeeds

in semi-shade but full sun is best for fruit production[200]. Prefers a sheltered position[200]. A very hardy plant, tolerating temperatures down to -30°C or more, but the young spring growth is susceptible to frost damage[160]. Some cultivars are said to tolerate temperatures down to about -50°C when fully dormant[160]. This species is often cultivated for its edible fruit and it is increasingly being seen as having potential in Britain. There are some named varieties[183]. Plants are usually dioecious but the cultivar 'Is-sai' is self-fertile[200]. A polymorphic species[74]. Fruits are formed on second year wood and also on fruit spurs on older wood[126], any pruning is best carried out in the winter[219]. Plants only flower when grown in warm climates[202]. This species flowers well in gardens in the south and west of Britain[219], the small flowers being sweetly scented[245]. This is a climbing plant, supporting itself by twining around branches etc[200]. Male and female plants must usually be grown if seed is required. Plants in this genus are notably resistant to honey fungus[200]. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. Woody. Growth habit is a single or multiple shooting vine from a crown [1-2]. The root pattern is a heart root, dividing from the crown into several primary roots going down and out [1-2].

5.2.10 Prunus domestica

Plum, European plum
4 tlin 9 cyuc 5 kcaak 3 tcan 2 dwat 12 m hkuc
hmimhtut cyullt tcup hwicli hrasjlutnyikfrip hpa7tli flatprikliw hpa7tmwatli fyfxre7t hjonli

drutta Prunus domestica is a deciduous Tree growing to 12 m (39ft) by 10 m (32ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in April, and the seeds ripen from July to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kckaeta Edible Parts: Flowers Fruit Oil Oil SeedEdible Uses: Gum Oil Oil TeaFruit - raw or cooked[1, 2, 7, 46]. The fruit varies considerably from cultivar to cultivar, but it is generally somewhat mealy, soft and juicy with a delicious flavour ranging from very sweet to acid[K]. The more acid fruits are usually only used for cooking purposes[K]. The fruit varies widely in size according to cultivar but can be 8cm long and contains a single large seed[200]. Seed - raw or cooked. Do not eat the seed if it is too bitter - see the notes above on toxicity. An edible gum is obtained from points of damage on the trunk[64]. The seed contains about 20% of an edible semi-drying oil[4, 57]. It has an agreeable almond smell and flavour[4]. The flowers are eaten. They are used as a garnish for salads and ice cream or brewed into a tea[183].

tcanta Adhesive Dye Gum Oil Oil WoodA green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168]. A yellow dye is obtained from the bark[115]. A gum obtained from points of damage along the stem can be used as an adhesive[64]. The ground up seeds are used cosmetically in the production of face-masks for dry skin[7]. A semi-drying oil is obtained from the seed[64]. No details of its uses. Wood - hard, compact. Used for musical instruments[115].

dwatta Febrifuge Laxative StomachicThe dried fruit, known as prunes, is a safe and effective laxative and is also stomachic[4, 7, 21, 238]. The bark is sometimes used as a febrifuge[7]. Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta Europe to W. Asia. Naturalized in Britain. A hybrid P. spinosa x P. cerasifera divaricata. ksacta Found in hedges in Britain[17].

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200]. Softwood cuttings from strongly growing plants in spring to early summer in a frame[200]. Layering in spring.

nwatta Requires a well-drained moisture retentive soil[1, 11] and a sheltered position[200]. Succeeds in light shade but fruits better in a sunny position[11, 200]. Thrives in a loamy soil, doing well on limestone[11]. Grows well in heavy clay soils. Prefers some chalk in the soil but it is apt to become chlorotic if too much is present[1]. Prefers a pH between 6 and 6.5[200]. The plum is widely cultivated for its edible fruit in temperate zones, there are many named varieties able to supply fresh fruits from late July to November or December[183]. Many cultivars are widely self-fertile, though some are partially self-sterile and others require cross-pollination[200]. Where space is at a premium, or at the limits of their climatic range, plums can be grown against a wall. Most cultivars will grow well against a sunny south or west facing wall, whilst an east facing wall will suit some of the tougher cultivars, a north facing wall is not really suitable[219]. This species is probably a hybrid of ancient origin between P. spinosa and P. cerasifera, coupled with chromosome doubling[17]. It does not cross-pollinate with the Japanese plum, P. salicina[200]. Prefers growing in a continental climate, mild winters tend to encourage earlier flowering with a greater risk of frost damage to the blossom. In Britain the best fruits are produced away from the western side of the country. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. Plants in this genus are notably susceptible to honey fungus[200]. The plant is heat tolerant in zones 8 through 3. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A sprouting standard sending up shoots from the base [1-2]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is flat with shallow roots spreading near the soil surface. The root pattern is suckering with new plants from runners away from the plant [2-1].

base. Remove a very thin slice of bark at the base of the cutting, rooting is improved if a rooting hormone is used. The rooted cuttings must show new growth during the summer before being potted up otherwise they are unlikely to survive the winter.

nwatta Landscape Uses:Specimen, Street tree. Of easy cultivation, it prefers a good moist well-drained soil but succeeds on most soils[11, 98]. Chlorosis can often develop as a result of iron deficiency when the plants are grown in alkaline soils, but in general maples are not fussy as to soil pH. Grows well in heavy clay soils. Trees need full light and a lot of space[98]. Plants are hardy to about -45°C when fully dormant[160]. This species is not a great success in Britain[11], though it does better than once thought[11]. It grows well in Cornwall[59]. Slow growing when young[11]. Plants produce prodigious root growth but very little top growth in first year from seed[133]. Trees grow rapidly for their first 25 years in the wild, but then slow down and only occasionally surviving for more than 200 years[229]. A very ornamental tree[1] but a bad companion plant, inhibiting the growth of nearby plants[18, 20]. This species is commercially exploited in America for its sap[1, 11]. Along with A. saccharum and the sub-species A. s. grandidentatum it is the major source of maple syrup[11]. There are some named varieties[183]. The sap can be tapped within 10 - 15 years from seed but it does not flow so well in areas with mild winters[160]. Special Features:North American native, Inconspicuous flowers or blooms. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2].

5.2.37 Quercus bicolor

Swamp White Oak
4 tlin 8 cyuc 4 kcaak 3 tcan 2 dwat 25 m hkuc
hmimhtut cyullt tcuphja7n hwicli jlutnyikfrip hpa7tli flatprikliw hpa7tmwatli hjonli

drutta Quercus bicolor is a deciduous Tree growing to 25 m (82ft 0in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in May, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil. The plant can tolerate strong winds but not maritime exposure.

kckaeta Edible Parts: SeedEdible Uses: CoffeeSeed - raw or cooked[105, 161, 226]. A rather sweet flavour[159, 235]. The seed is quite large, about 2 - 3cm long and 15 - 20mm wide[82, 200], and unlike most other oaks, is attached to the tree by a long stem[183]. It matures in its first year[235]. The seed can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread[183]. The seed from some trees can contain bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overnight. The germinating seed was dug up in the spring when

it would have lost most of its astringency. Roasted seed is a coffee substitute.

tcanta Repellent Rust Tannin WoodThe leaves of most species in this genus are more or less rich in tannins. A mulch of the leaves can be placed around vulnerable plants in order to repel slugs, snails, grubs etc. Fresh leaves should be used with caution, since these can utilize some of the nitrogen in the soil and this inhibit plant growth[20 , K]. Oak galls are excrecences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. The bark has been boiled with hemlock (Tsuga sp.?) and soft maple bark (Acer spp), and the liquid used to remove rust. The mixture was also believed to prevent rust[257]. The wood is close-grained, strong, hard, tough, heavy[46 , 82 , 171 , 229]. It weighs 48lb per cubic foot[235]. Trees do not self-prune and dead branches remain on the trees for many years. This does mean that the wood is usually quite knotty[226]. The wood machines well, though it can check and warp if not dried properly. It is of some importance commercially. And is used for construction, cabinet making, furniture, interior finishes, veneers, fence posts etc[6 , 82 , 171 , 229 , 338 , 1050]. The wood makes a good fuel.

dwatta Astringent DysenteryAny galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta Eastern N. America - Quebec to Minnesota, Georgia and Arkansas. ksacta Bottomlands, stream margins and swamps[43]. Tolerant of poorly drained sites, it is frequently found in heavy mucky soils[229].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Landscape Uses:Pest tolerant, Specimen, Street tree. Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. Prefers warmer summers than are usually experienced in Britain, trees often grow poorly in this country and fail to properly ripen their wood resulting in frost damage overwinter[200]. A relatively fast-growing tree in the wild, living 300 - 350 years[229], though it is relatively shallow-rooted and is considerably more susceptible to forest fires than most other oaks[226]. This species is one of the best of the white oaks for growing in this country[1]. However, it is said that the seed is rarely formed in Britain[105]. The tree flowers on new growth produced in spring, the seed ripening in its first year[200, 229]. Trees do not commence bearing until about 25 - 30 years old, large crops being produced every 3 - 5 years[229]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. The seed of this species is attached to the tree by unusually long (by oak tree standards) stems[183]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: Attracts birds, North American native, Attracts butterflies, Inconspicuous flowers or blooms. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2].

tcanta Charcoal Fuel Hedge Hedge Oil Stuffing Teeth WoodA semi-drying oil is obtained from the seed, it is used as a fuel for lighting, as a lubricant, for polishing wood etc[12, 13, 46, 57, 63]. The seed residue is poisonous[9, 57]. The leaf buds harvested in the winter and dried on the twigs are used as toothpicks[66]. The leaves are gathered in autumn and used as a stuffing material for mattresses etc[115]. Wood - hard, heavy, strong, very durable[13, 46]. It is not suitable for outdoor use[1] and is often attacked by a small beetle[4]. It has a wide range of applications, including furniture, flooring, turnery etc[100]. It makes a very good fuel[6, 66], burning with a lot of heat[4], and yields a charcoal known as 'Carbo Ligni Pulveratus'[46]. The wood has often been used as a source of creosote, tar, methyl alcohol. acetic acid[123]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Antacid Antipyretic Antiseptic Antitussive Bach Expectorant Odontalgic SkinThe bark is antacid, antipyretic, antiseptic, antitussive, expectorant, odontalgic[7, 9]. A tar (or creosote), obtained by dry distillation of the branches, is stimulating and antiseptic[4]. It is used internally as a stimulating expectorant and externally as an application to various skin diseases[4, 238]. The pure creosote has been used to give relief from toothache, but it should not be used without expert guidance[7]. The plant is used in Bach flower remedies - the keywords for prescribing it are 'Intolerance', 'Criticisim' and 'Passing judgements'[209].

nrakta Europe, including Britain, from Norway south and east to Spain, Greece, W. Russia and the Crimea. ksacta Grows in woodlands where it is often the dominant species, especially on chalky and soft limestone soils, though sometimes also on well-drained loams and sands[13, 17].

propta Seed - the seed has a short viability and is best sown as soon as it is ripe in the autumn in a cold frame. Protect the seed from mice. Germination takes place in the spring. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. The seedlings are slow growing for the first few years and are very susceptible to damage by late frosts. The seed can also be sown in an outdoor seedbed in the autumn[186]. The seedlings can be left in the open ground for three years before transplanting, but do best if put into their final positions as soon as possible and given some protection from spring frosts.

nwatta Landscape Uses:Firewood, Pest tolerant, Hedge, Aggressive surface roots possible, Screen, Specimen. Thrives on a light or medium soil, doing well on chalk, but ill-adapted for a heavy wet soil[1, 11]. Prefers a calcareous soil but succeeds in acid soils though it does not make such a fine tree in such a situation[186]. Succeeds in almost any soil and any pH, it is also very tolerant of a wide range of climatic conditions so long as there is sufficient rainfall[200]. Established trees are drought tolerant[186]. Very wind tolerant but dislikes salt[200]. Trees are shallow rooted and this might make them less wind resistant[186]. Trees have two growth periods a year, each of about 3 weeks in duration. The first is in spring around the end of April, the second is in summer, around the end of July. Trees are often slow growing and also can be very slow to establish after transplanting. However, in good conditions they are capable of growing up to a metre in a year. Young trees are very shade tolerant, but are subject to frost damage to their flowers and young leaves and so are best grown in a woodland position which will protect them[200]. An important food plant for many caterpillars, it has 64 species of associated insects[24]. Trees have a heavy canopy and cast a dense shade, very few other species can grow in a dense beech wood and on suitable soils it becomes the dominant species[186]. Very intolerant of coppicing, trees producing none or only very weak growth afterwards and this is soon smothered by other plants[186]. Plants are very tolerant of light pruning however and if this is carried out in late summer the plants will retain their dead leaves over winter[29]. There are many named forms selected for their ornamental value. Those forms with purple leaves prefer a position in full sun whilst forms with yellow leaves prefer some shade[188]. This species is notably resistant to honey fungus[200]. Special Features: Not North American native, All or parts of this plant are poisonous, Inconspicuous flowers or blooms. The plant is heat tolerant

in zones 9 through 4. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A sprouting standard sending up shoots from the base [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

5.2.36 Acer saccharum nigrum

Black Maple

4 tlin 6 cyuc 4 kcaak 2 tcan 1 dwat 25 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnykifrip hpa7tli flatprikl-wis hpa7tmwatli hjonli

drutta Acer saccharum nigrum is a deciduous Tree growing to 25 m (82ft 0in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in April, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcaakta Edible Parts: Inner bark Sap SeedEdible Uses: SweetenerThe sap contains reasonable quantities of sugar and can be used as a drink or concentrated into a syrup by boiling off the water[1, 2, 11, 43, 34, 57, 142, 159]. The syrup is used as a sweetener on many foods. The sap can be harvested in late winter or early spring[142], the flow is best on a warm sunny day after a frost. Trees on southern slopes in sandy soils give the best yields. It is best to make a hole about 7cm deep and about 1.3 metres above the ground[171]. Yields of 40 - 100 litres per tree can be obtained[142]. The best sap production comes from cold-winter areas with continental climates. Seed - boiled then roasted[62, 105, 159]. The seed is about 6mm long and is produced in small clusters[82]. Inner bark - cooked. It is dried, ground into a powder and then used as a thickening in soups etc or mixed with cereals when making bread[105, 161].

tcanta Fuel Preservative WoodThe leaves are packed around apples, rootcrops etc to help preserve them[18, 20]. Wood - close grained, tough, hard, heavy. Used for furniture, ship building, etc[43, 46, 61, 82, 171]. It is a good fuel[82]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta AstringentA decoction of the inner bark has been used in the treatment of diarrhoea[257].

nrakta Eastern N. America - Quebec to Alabama, west to South Dakota and Arkansas. ksacta Rich calcareous or alluvial woods[43]. Found in a variety of soil types, near streams, rivers and in rich woodlands, usually below 750 metres but up to 1650 metres in the south of its range[229].

propta Seed - best sown as soon as it is ripe in a cold frame, it usually germinates in the following spring. A lot of the seed is non-viable, it is best to cut a few open to see if there is an embryo[113]. An average of 95% germination can be achieved from viable seed[98]. Pre-soak stored seed for 24 hours and then stratify for 2 - 4 months at 1 - 8°C. It can be slow to germinate, sometimes taking two years[125]. The seed can be harvested 'green' (when it has fully developed but before it has dried and produced any germination inhibitors) and sown immediately. It should germinate in late winter. If the seed is harvested too soon it will produce very weak plants or no plants at all[80, 113]. When large enough to handle, prick the seedlings out into individual pots and grow them on until they are 20cm or more tall before planting them out in their permanent positions. Layering, which takes about 12 months, is successful with most species in this genus. Cuttings of young shoots in June or July. The cuttings should have 2 - 3 pairs of leaves, plus one pair of buds at the

5.2.11 Rubus procerus

Himalayan Giant Blackberry

4 tlin 8 cyuc 5 kcaak 1 tcan 0 dwat 10 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyk hpa7tli flatpriklwis hpa7tmwatli fyfxre7t hjonli

drutta Rubus procerus is a deciduous Shrub growing to 10 m (32ft 10in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcaakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked in pies, cakes etc[3, 105, 183]. The fruit can also be dried for later use[183]. Very large for a blackberry[50, 183] with a very pleasant rich flavour when fully ripe[K].

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

nrakta C. Europe. ksacta Not known

propta Seed - requires stratification and is best sown in early autumn in a cold frame. Stored seed requires one month stratification at about 3°C and is best sown as early as possible in the year. Prick out the seedlings when they are large enough to handle and grow on in a cold frame. Plant them out into their permanent positions in late spring of the following year. Cuttings of half-ripe wood, July/August in a frame[200]. Tip layering in July. Plant out in autumn. Division in early spring or just before leaf-fall in the autumn[200].

nwatta Easily grown in a good well-drained loamy soil in sun or semi-shade[1, 11, 200]. A form of this species, known as 'Himalayan giant', is commonly cultivated in temperate zones for its edible fruit[50]. Although a blackberry, the stems are often perennial and can fruit for more than one year[50]. This name may be wrongly applied. According to the new RHS Dictionary of Gardening, the correct name for the 'Himalayan Giant' blackberry is *R. procerus*. P.J.Muell., the name *R. discolor* is misapplied. Plants in this genus are notably susceptible to honey fungus[200].

5.2.12 Crataegus pedicellata

Scarlet Haw, Scarlet hawthorn

4 tlin 8 cyuc 5 kcaak 2 tcan 2 dwat 7 m hkuc hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnykifrip hpa7tli flatpriklwissip hpa7tmwatli xre7t hjonli

drutta Crataegus pedicellata is a deciduous Shrub growing to 7 m (23ft) by 7 m (23ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to May, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcaakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[K]. A very variable species, especially in its fruit which ranges considerable in size and quality[K]. Up to 10mm long and pear shaped, the flesh is sweet but dry and mealy[200]. Another report says that the fruit is up to 20mm in diameter[235] and we have often seen fruits this size, or even a bit larger[K]. We find the fruits of the best forms to have an excellent flavour and juicy texture when fully ripe, but with a hint of bitterness before then[K]. They are one of the later members of this genus to ripen their fruit[K]. The fruit can be used in making pies, preserves, etc, and can also be dried for later use. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers

of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta Northeastern N. America - Connecticut to Ontario, Illinois and Pennsylvania. Naturalized in Britain. ksacta Self-sown in hedges and rough ground in south-eastern England.

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Plants are hardy to at least -18°C[202]. A very variable species, it has been divided up into several different species by some botanists[82]. The sub-species *C. pedicellata gloriosa*. Sarg. has larger fruits than the type[11]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. A user in Poland says that *Crataegus pedicellata* exists in the wild in Eastern Poland and can support winter temperatures at least until -30C.

5.2.13 Corylus avellana

Common Hazel, Common filbert, European Filbert, Harry Lauder's Walking Stick, Corkscrew Hazel, Hazel

4 tlin 8 cyuc 5 kcaak 5 tcan 2 dwat 6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyk hpa7tli frusflatprikl-wissip hpa7tmwatli dyat hjonli

drutta Corylus avellana is a deciduous Tree growing to 6 m (19ft) by 3 m (9ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from January to April, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is not self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It

prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

ksakta Edible Parts: Oil Oil Seed**Edible Uses:** Milk Oil OilSeed - raw or roasted and used in breads, cakes, biscuits, sweets etc[2, 5, 9, 12, 13, 34, 183]. An excellent nut for raw eating[K]. They can also be liquified and used as a plant milk[183]. Rich in oil. The seed ripens in mid to late autumn and will probably need to be protected from squirrels[K]. When kept in a cool place, and not shelled, the seed should store for at least 12 months[K]. A clear yellow edible oil is obtained from the seed[7, 9, 183]. It is used in salad dressings, baking etc.

tcanta Basketry Charcoal Cosmetic Hedge Hedge Miscellany Oil Oil Plant support Polish Tannin WoodThe seed contains up to 65% of a non-drying oil, used in paints, cosmetics etc[13, 46, 57, 132]. The whole seed can be used to polish and oil wood[6]. It is very easy to apply and produces a nice finish[K]. The finely ground seeds are used as an ingredient of face masks in cosmetics[7]. Plants can be grown as a tall hedge[29]. They need to be left untrimmed or only lightly trimmed if seed is required[29]. The bark and leaves are a source of tannin[7]. Wood - soft, easy to split, not very durable, beautifully veined. Used for inlay work, small items of furniture, hurdles, wattles, basketry, pea sticks etc[7, 13, 23, 46, 61, 63, 66, 125]. The twigs are used as dowling rods by water diviners[11]. The wood also yields a good quality charcoal, used by artists[63, 101].

dwatta Anthelmintic Astringent Diaphoretic Febrifuge Miscellany Nutritive Stomachic TonicThe bark, leaves, catkins and fruits are sometimes used medicinally[7]. They are astringent, diaphoretic, febrifuge, nutritive and odontalgic[7]. The seed is stomachic and tonic[240]. The oil has a very gentle but constant and effective action in cases of infection with threadworm or pinworm in babies and young children[7].

nrakta Europe, including Britain, from Norway to Spain and east to W Asia. **ksacta Woods** and hedgerows, especially on the slopes of hills, often on calcareous soils[7, 17].

propta Seed - best sown as soon as it is harvested in autumn in a cold frame[164]. Germinates in late winter or spring. Stored seed should be pre-soaked in warm water for 48 hours and then given 2 weeks warm followed by 3 - 4 months cold stratification[164]. Germinates in 1 - 6 months at 20°C[164]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame or sheltered place outdoors for their first winter. Plant them out into their permanent positions in late spring or early summer[K]. Layering in autumn. Easy, it takes about 6 months[78, 200]. Division of suckers in early spring. Very easy, they can be planted out straight into their permanent positions.

nwatta Global Crop Industrial Crop: Biomass Management Coppice Management: Standard Staple Crop: Protein-oil Landscape Uses: Container, Standard, Specimen. An easily grown plant, it succeeds in most soils, but is in general more productive of seeds when grown on soils of moderate fertility[11, 200]. It does less well in rich heavy soils or poor ones[11, 63]. Does well in a loamy soil[11]. Very suitable for an alkaline soil[11], but it dislikes very acid soils[17]. Succeeds in a pH range 4.5 to 8.5, but prefers a range of 5 to 7[200]. Plants are fairly wind tolerant[1, 11]. A very hardy plant, succeeding in all areas of Britain[200]. The flowers, however, are produced in late winter and early spring and can be damaged by heavy frosts at this time[200]. A parent, together with *C. maxima*, of many cultivated forms of filberts and cob nuts. There are many named varieties[11]. Plants are self-fertile but a more certain crop is obtained if more than one cultivar is grown[200]. The main difference between cob nuts and filberts is that the husk of a filbert is longer than the seed and often completely encloses it, whilst the husk on a cob nut is shorter than the seed[200]. Squirrels are a major pest of this plant, often decimating the crop of nuts[200]. Often grown as a coppiced shrub in woodlands, the stems have a variety of uses[23, 67, 186]. Members of this genus bear transplanting well and can be easily moved even when relatively large[11]. A food plant for the caterpillars of many lepidoptera species[30]. **Special Features:** Not North American native, Attractive flowers or blooms. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone

map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A clumping plant, forming a colony from shoots away from the crown but with a limited spread [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

5.2.14 *Pyrus communis sativa*

Pear

4 tlin 8 cyuc 5 kcaak 3 tcan 0 dwat 5 m hkuc hmimhtut cyuti hgaattcup hwicli hrasjlutnyikfrp hpa7tli flat-prikliwis hpa7tmwattli dyatxe7t hjonli

drutta *Pyrus communis sativa* is a deciduous Tree growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. It can tolerate atmospheric pollution.

ksakta Edible Parts: Fruit**Edible Uses:** Fruit - raw or cooked. The flavour ranges from rather harsh and astringent (cultivars used for making alcoholic drinks) through to soft, sweet and very juicy. The best dessert fruits have an exquisite sweet flavour, usually with a very soft flesh, whilst cooking varieties have harder less sweet flesh[K].

tcanta Dye WoodA yellow-tan dye is obtained from the leaves[106, 115]. Wood - heavy, tough, durable, fine grained, hard. Used by cabinet and instrument makers[11, 61, 100, 149]. When covered with black varnish it is an excellent ebony substitute[74].

nrakta A garden cultivar, probably derived from *P. communis*, *P. cordata* and *P. nivalis*[11]. **ksacta** Not known in the wild.

propta Seed - best sown in a cold frame as soon as it is ripe in the autumn, it will then usually germinate in mid to late winter. Stored seed requires 8 - 10 weeks cold stratification at 1°C and should be sown as early in the year as possible[200]. Temperatures over 15 - 20°C induce a secondary dormancy in the seed[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for their first year. Plant them out in late spring or early summer of the following year. The seed of pear cultivars will not usually breed true to type.

nwatta Prefers a good well-drained loam in full sun[200]. Grows well in heavy clay soils[200]. Tolerates light shade but does not fruit so well in such a position. Tolerates atmospheric pollution, excessive moisture and a range of soil types if they are moderately fertile, though plants can become chlorotic on very alkaline soils[200]. Established plants are drought tolerant[200]. Very hardy, tolerating temperatures down to below -15°C[200]. Widely cultivated for its edible fruit in temperate areas, there are many named varieties that can provide fruit from late July to April or May of the following year. This is the collective name for all the pear cultivars that have been derived from *P. communis*, probably through hybridization with *P. cordata* and *P. nivalis*. Where space is at a premium, or at the limits of their climatic range, pears can be grown against a wall. Most cultivars will grow well against a sunny south or west facing wall but, because of their relatively early flowering, they are not really suitable for north or east facing walls[219]. Most cultivars are not self-fertile and a number of cultivars have incompatible pollen, so care must be taken to ensure the provision of a suitable pollen partner[200]. Trees grow less well in grass, root secretions from the grass inhibiting the root growth of the pear[201]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in

important food plant for the caterpillars of many species of butterfly[30], there are 284 insect species associated with this tree[24]. It has often been coppiced or pollarded for its wood in the past[23], though this should not be done too frequently[186], about once every 50 years is the average. The tree flowers on new growth produced in spring, the seed ripening in its first year[200, 229]. Older trees have a thick corky bark and this can protect them from forest fires, young trees will often regenerate from the base if cut down or killed back by a fire[186]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. Hybridizes freely with other members of the genus[200]. Immune to attacks by the tortrix moth[1]. This species is notably resistant to honey fungus[88, 200].

5.2.34 *Aesculus spp*

Horse chestnut

4 tin 9 cyuc 4 kcaak 4 tcan 4 dwat 30 m hkuc hmimhtut cyuti kyucctcup hwicli hyishrasjlutnyikfrp hpa7tli flat-prikliwis hpa7tmwattli hjonli

drutta *Aesculus spp* is a deciduous Tree growing to 30 m (98ft) by 25 m (82ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

pcista The seed is rich in saponins[10, 21, 65]. Although poisonous, saponins are poorly absorbed by the human body and so most pass through without harm. Saponins are quite bitter and can be found in many common foods such as some beans. They can be removed by carefully leaching the seed or flour in running water. Thorough cooking, and perhaps changing the cooking water once, will also normally remove most of them. However, it is not advisable to eat large quantities of food that contain saponins. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K]. Avoid in patients with kidney or liver disease. Avoid if taking warfarin as can interfere with anticoagulant therapy [301].

ksakta Edible Parts: Seed**Edible Uses:** The roasted seed is used as a coffee substitute[2, 7]. Seed - cooked. It can be dried, ground into a powder and used as a gruel[7, 46, 55, 61]. The seed is quite large, about 3cm in diameter, and is easily harvested. It is usually produced in abundance in Britain. Unfortunately the seed is also rich in saponins, these must be removed before it can be used as a food and this process also removes many of the minerals and vitamins, leaving behind mainly starch. See also the notes above on toxicity. The seed contains up to 40% water, 8 - 11% protein and 8 - 26% toxic saponins[218]. The following notes apply to *A. californica*, but are probably also relevant here:- The seed needs to be leached of toxins before it becomes safe to eat - the Indians would do this by slow-roasting the nuts (which would have rendered the saponins harmless) and then cutting them into thin slices, putting them into a cloth bag and rinsing them in a stream for 2 - 5 days[213].

tcanta Saponins in the seed are used as a soap substitute[169]. The saponins can be easily obtained by chopping the seed into small pieces and infusing them in hot water. This water can then be used for washing the body, clothes etc. Its main drawback is a lingering odour of horse chestnuts[K]. The seed contains variable amounts of saponins, up to a maximum of 10%[240]. A starch obtained from the seed is used in laundering[100]. The bark and other parts of the plant contain tannin, but the quantities are not given[223]. A yellow dye is obtained from the bark[4]. The flowers contain the dyestuff quercetin[223]. Wood - soft, light, not durable. Of little commercial value, it is used for furniture, boxes, charcoal[2, 11, 46, 61]. **Carbon Farming Solutions - Industrial Crop:** starch, medicinal (Crops grown for non-food uses. Industrial crops provide resources in three main categories: materials, chemicals, and energy. Traditional materials include lumber and thatch, paper and cardboard, and textiles) [1-1].

dwatta Various medicinal qualities depending on the species. They include: Alterative; Analgesic; Antiinflammatory; Antirheumatic; Astringent; Bach; Diuretic; Expecto-rant; Febrifuge; Haemostatic; Narcotic; Tonic; Vasoconstrictor; Vulneryary.

nrakta N. Temperate. **ksacta** Trees and shrubs native to the temperate Northern Hemisphere, with six species native to North America and seven to 13 species native to Eurasia.

propta Seed - best sown outdoors or in a cold frame as soon as it is ripe[11, 80]. The seed germinates almost immediately and must be given protection from severe weather[130]. The seed has a very limited viability and must not be allowed to dry out. Stored seed should be soaked for 24 hours prior to sowing and even after this may still not be viable[80, 113]. It is best to sow the seed with its 'scar' downwards[130]. If sowing the seed in a cold frame, pot up the seedlings in early spring and plant them out into their permanent positions in the summer.

nwatta Hypothetical Crop **Industrial Crop: Medicinal Industrial Crop: Starch** Management: StandardClimate: cold to warm temperate, Mediterranean.Humidity: semi-arid to humid. **Landscape Uses:** Firewood, Pollard, Specimen, Street tree. Prefers a deep loamy well-drained soil but is not too fussy tolerating poorer drier soils[11, 200]. Tolerates exposed positions and atmospheric pollution[200]. A very ornamental and fast-growing tree[1, 4], it succeeds in most areas of Britain but grows best in eastern and south-eastern England[200]. Trees are very hardy when dormant, but the young growth in spring can be damaged by late frosts. The flowers have a delicate honey-like perfume[245]. Trees are tolerant of drastic cutting back and can be severely lopped[200]. They are prone to suddenly losing old heavy branches[98]. The tree comes into bearing within 20 years from seed[98]. Most members of this genus transplant easily, even when fairly large[11]. **Special Features:** Attractive foliage, Not North American native, Naturalizing, Blooms are very showy. **Carbon Farming Solutions - Cultivation:** hypothetical. **Management:** standard (Describes the non-destructive management systems that are used in cultivation) [1-1].

5.2.35 *Fagus sylvatica*

Beech, European beech, Common Beech

4 tin 7 cyuc 4 kcaak 4 tcan 2 dwat 30 m hkuc pcmhmimhtut cyuti kyucctcup hwicli hrasjlutnyik hpa7tli frusflatprikliwissip hpa7tmwattli hjonli

drutta *Fagus sylvatica* is a deciduous Tree growing to 30 m (98ft) by 15 m (49ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to May, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

pcista Large quantities of the seed may be toxic[65, 76]. **ksakta Edible Parts:** Leaves Oil Seed**Edible Uses:** Coffee OilYoung leaves - raw[183]. A very nice mild flavour, they go well in a mixed salad. However, the leaves quickly become tough so only the youngest should be used[2, 5, 12, K]. New growth is usually produced for 2 periods of 3 weeks each year, one in spring and one in mid-summer. Seed - raw or cooked[2, 5, 7, 63, 183]. A pleasant sweet flavour, though rather small and fiddly[K]. The seed can also be dried and ground into a powder and then used with cereal flours when making bread, cakes etc[12]. The seed is rich in oil. The seed should not be eaten in large quantities because it contains a deleterious principle[65, 238]. The seed contains 17 - 20% of an edible semi-drying oil[4, 7, 8, 57]. This stores well without going rancid and is said to be equal in delicacy to olive oil[183]. It is used as a dressing for salads and also for cooking[238]. The seed residue is poisonous[9, 57]. The roasted seed is used as a coffee substitute[2, 63].

tree, Woodland garden. Of easy cultivation, it prefers a good moist well-drained soil but succeeds on most soils[11, 98], though it is more likely to become chlorotic as a result of iron deficiency on alkaline soils. Grows well in heavy clay soils. Trees need full light and a lot of space[98]. This species is one of the most shade tolerant of the N. American maples[226]. It tolerates atmospheric pollution[200] and so is often used as a street tree, though it can suffer from soil compaction and the use of salt on the roads in frosty weather. Tolerates a pH in the range 4.5 to 7.3. Hardy to about -45°C when fully dormant[160]. A fast-growing tree for its first 40 years in the wild[229], this species is not a great success in Britain[1], though it does better than once thought[11]. It grows well in Cornwall[59]. In cultivation it has proved to be slow growing when young[11]. Trees can live for 250 years in the wild[229]. A very ornamental tree[1] but a bad companion plant, inhibiting the growth of nearby plants[18, 20]. This species is commercially exploited in America for its sap[1, 11]. Along with its sub-species it is the major source of maple syrup[11]. There are some named varieties[183]. The sap can be tapped within 10 - 15 years from seed but it does not flow so well in areas with mild winters[160]. Special Features: Attracts birds, North American native, Inconspicuous flowers or blooms. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2]. The root pattern is a heart root, dividing from the crown into several primary roots going down and out [1-2].

5.2.33 Quercus robur

Pedunculate Oak, English oak

4 tin 8 cyuc 4 kcaak 5 tcan 3 dwat 30 m hkuc hmimhtut cyulti hgattcuphja7n hwicli:jlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli hjonli

drutta Quercus robur is a deciduous Tree growing to 30 m (98ft) by 30 m (98ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from April to May, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. It is noted for attracting wildlife. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure.

pcista Possible digestive complaints. May delay absorption of alkaloids and other alkaline drugs [301].

kckaata Edible Parts: SeedEdible Uses: Coffee Gum-Seed - cooked[2, 5, 8, 13]. Nourishing but indigestible[4]. Chopped and roasted, the seed is used as an almond substitute[8]. It can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread[183]. The seed contains bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost[63]. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute[21,

61]. An edible gum is obtained from the bark[177]. Another report says that an edible manna is obtained from the plant and that it is used instead of butter in cooking[183]. This report probably refers to the gum[K].

tcanta Basketry Charcoal Compost Fuel Gum Ink Repellent Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20, 201]. The bark is an ingredient of 'Quick Return' herbal compost activator[32]. This is a dried and powdered mixture of several herbs that can be added to a compost heap in order to speed up bacterial activity and thus shorten the time needed to make the compost[K]. The bark is very rich in calcium[18]. Oak galls are excrecences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. A black dye and an excellent long-lasting ink is made from the oak galls, mixed with salts of iron[4, 7, 66]. The colour is not very durable[4]. When mixed with alum, the dye is brown and with salts of tin it is yellow[4]. Trees can be coppiced to provide material for basket making, fuel, construction etc[23]. The wood is a source of tar, quaiacol, acetic acid, creosote and tannin[123]. Tannin is extracted commercially from the bark and is also found in the leaves[223]. On a 10% moisture basis, the bark contains 1.6% tannin and the wood 9.2%[223]. The bark strips easily from the wood in April and May[4]. A purplish dye is obtained from an infusion of the bark with a small quantity of copperas[4]. It is not bright, but is said to be durable[4]. Wood - hard, tough, durable even under water - highly valued for furniture, construction etc[4, 13, 61, 66]. It is also a good fuel[6] and charcoal[61].

dwatta Antiseptic Astringent Bach Decongestant Dysentery Haemostatic TonicThe oak tree has a long history of medicinal use. It is anti-inflammatory, antiseptic, astringent, decongestant, haemostatic and tonic[4, 7, 9, 13, 21, 165]. The bark is the part of the plant that is most commonly used[4], though other parts such as the galls, seeds and seed cups are also sometimes used[7]. A decoction of the bark is useful in the treatment of chronic diarrhoea, dysentery, intermittent fevers, haemorrhages etc[4]. Externally, it is used to bathe wounds, skin eruptions, sweaty feet, piles etc[9]. It is also used as a vaginal douche for genital inflammations and discharge, and also as a wash for throat and mouth infections[9]. The bark is harvested from branches 5 - 12 years old, and is dried for later use[9]. Any galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4]. The plant is used in Bach flower remedies - the keywords for prescribing it are 'Despondency', 'Despair, but never ceasing effort'[209]. A homeopathic remedy is made from the bark. It is used in the treatment of disorders of the spleen and gall bladder[9]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Quercus robur Pedunculate Oak for coughs/bronchitis, diarrhoea, inflammation of mouth and pharynx, inflammation of the skin (see [302] for critics of commission E).

nrakta Europe, including Britain, from Scandinavia south and east to Spain, the Urals and Crimea. ksacta Often the dominant woodland tree, especially on clay soils and in the eastern half of Britain, but avoiding acid peat and shallow limestone soils[17].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Prefers a good deep fertile loam which can be on the stiff side[11]. Young plants tolerate reasonable levels of side shade[200]. Succeeds in heavy clay soils[13] and in wet soils so long as the ground is not water-logged for long periods[186]. Dislikes dry or shallow soils but is otherwise drought tolerant once it is established[186]. Tolerant of exposed sites though it dislikes salt-laden winds[186]. The oak is a very important timber tree in Britain, it is also a very

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

5.2.15 Amelanchier alnifolia

Saskatoon, Saskatoon serviceberry, Serviceberry
4 tin 6 cyuc 5 kcaak 3 tcan 2 dwat 30 m hkuc hmimhtut cyulti tcup hwicli hras:jlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli fyfcre7t hjonli

drutta Amelanchier alnifolia is a deciduous Shrub growing to 4 m (13ft) by 3 m (9ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 2 and is not frost tender. It is in flower in May, and the seeds ripen from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kckaata Edible Parts: FruitEdible Uses: TeaEdible fruit - raw or cooked[3, 11, 46, 62, 101]. The fruit ripens in mid summer (early July in southern Britain), it is soft and juicy with a few small seeds in the centre. A very nice sweet flavour that is enjoyed by almost everyone who tries it, there is a hint of apple in the taste[K]. About the size of a blackcurrant, the fruit is produced in small clusters and the best wild forms can be 15mm in diameter[200, 212]. The fruit can also be dried and used as raisins or made into pemmican[101, 183]. The fruit is rich in iron and copper[226]. The leaves are a tea substitute[161, 257].

tcanta Shelterbelt Soil stabilizationPlants have a spreading, suckering root system and are used in windbreaks for erosion control[200]. Young branches can be twisted to make a rope[257]. Wood - hard, straight grained, tough. Used for tool handles etc. The wood can be made even harder by heating it over a fire and it is easily moulded whilst still hot[99]. The young stems are used to make rims, handles and as a stiffening in basket making[257]. Landscape Uses: Erosion control, Massing, Woodland garden. Hedging and Screens, Architectural City and Courtyard Gardens Cottage and Informal Garden, Wildlife Gardens (RHS).

dwatta Appetizer Birthing aid Contraceptive Diaphoretic Febrifuge Laxative Ophthalmic StomachicSaskatoon was quite widely employed as a medicinal herb by the North American Indians, who used it to treat a wide range of minor complaints[257]. It is little used in modern herbalism. An infusion of the inner bark is used as a treatment for snow-blindness[172]. A decoction of the fruit juice is mildly laxative. It has been used in the treatment of upset stomachs, to restore the appetite in children, it is also applied externally as ear and eye drops[257]. A decoction of the roots has been used in the treatment of colds[257]. It has also been used as a treatment for too frequent menstruation[257]. A decoction of the stems, combined with the stems of snowberry (Symphoricarpos spp) is diaphoretic. It has been used to induce sweating in the treatment of fevers, flu etc and also in the treatment of chest pains and lung infections[257]. A decoction of the plant, together with bitter cherry (Prunus emarginata) has been used as a contraceptive[257]. Other recipes involving this plant have also been used as contraceptives including a decoction of the ashes of the plant combined with the ashes of pine branches or buds[257]. A strong decoction of the bark was taken immediately after childbirth to hasten the dropping of the placenta. It was said to help clean out and help heal the woman's insides and also to stop her menstrual periods after the birth, thus acting as a form of birth control[257].

nrakta Western and Central N. America - Saskatchewan and south to Colorado and Idaho. ksacta Thickets, woodland edges and banks of streams[43] in moist well-drained soils[99, 200]. Small bushy forms grow on fairly dry hillsides[212].

propta Seed - it is best harvested 'green', when the seed is fully formed but before the seed coat has hardened, and then sown immediately in pots outdoors or in a cold frame. If stored seed is obtained early enough in the autumn, it can be given 4 weeks warm stratification before being left out in

the winter and it should then germinate in the spring. Otherwise seed can be very slow to germinate, perhaps taking 18 months or more. When large enough to handle, prick the seedlings out into individual pots and grow them on in a sheltered outdoor position, planting them out once they are 20cm or more tall. If there is sufficient seed it is best to sow it thinly in an outdoor seedbed[78, 80]. Grow the seedlings on for two years in the seedbed before planting them out into their permanent positions during the winter. Layering in spring - takes 18 months[78]. Division of suckers in late winter. The suckers need to have been growing for 2 years before you dig them up, otherwise they will not have formed roots. They can be planted out straight into their permanent positions if required.

nwatta Prefers a rich loamy soil in a sunny position or semi-shade[1, 200] but thrives in any soil that is not too dry or water-logged[11]. Plants are fairly lime tolerant[200], they also grow well in heavy clay soils. Hardy to about -20°C according to one report[184], whilst another suggests that this species is hardy to about -50°C[11]. All members of this genus have edible fruits and, whilst this is dry and uninteresting in some species, in many others it is sweet and juicy. Many of the species have potential for use in the garden as edible ornamentals. This species is particularly interesting because it is quite compact and produces an excellent quality quite large fruit[K]. The main draw-back to this genus is that birds adore the fruit and will often completely strip a tree before it is fully ripe[K]. A very variable species, ranging from a thicket-forming shrub to a small tree in the wild[229]. It is occasionally cultivated for its edible fruit, there are several named varieties[183]. A stoloniferous species, spreading by suckers to form a thicket[11]. Hybridizes freely with other members of this genus[200]. Grafting onto seedlings of A. lamarckii or Sorbus aucuparia is sometimes practised in order to avoid the potential problem of hybridizing[1]. Special Features: North American native, Blooms are very showy. The plant is heat tolerant in zones 8 through 3. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2].

5.2.16 Rubus phoenicolasius

Japanese Wineberry, Wine raspberry

4 tin 8 cyuc 5 kcaak 1 tcan 0 dwat 3 m hkuc hmimhtut cyulti tcup hwicli hras:jlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Rubus phoenicolasius is a deciduous Shrub growing to 3 m (9ft) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to July, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kckaata Edible Parts: FruitEdible Uses: Fruit - raw or cooked[1, 2, 3, 34]. Sweet and juicy[11]. A raspberry-type fruit, it is smaller than a raspberry, contains rather a lot of seeds and is not quite such a flavourful fruit, but it makes very nice eating all the same[K]. After flowering, the fruit is enclosed in its calyx until just before it is ripe, this prevents maggots etc getting into the fruit[K]. The fruit is about 20mm in diameter[200].

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

nrakta E. Asia - N. China, Japan, Korea. Occasionally naturalized in Britain[17]. ksacta Waste places and clearings in lowland and mountains all over Japan[58]. Roadside and montane valleys at low to medium elevations in China[266].

propta Seed - requires stratification, is best sown in early autumn in a cold frame. Sow stored seed as early as possible in the year in a cold frame and stratify for a month at 3°C if sowing later than February. Prick out the seedlings when they are large enough to handle and grow on in a cold frame. Plant them out into their permanent positions in late spring of the following year. Tip layering in July. Plant out in autumn. Division in early spring.

nwatta Easily grown in a good well-drained loamy soil in sun or semi-shade[1, 11, 200], preferring light shade[202]. Plants are not too happy when grown in windy situations[K]. Hardy to about -18°C[202]. Some damage may be caused at this temperature but plants usually recover well[202]. A very ornamental plant, its red stems adding colour to the winter garden[1], it is sometimes cultivated for its edible fruit[1, 61]. There is at least one named variety, 'Bella di Tokyo' has small tasty red fruits[183]. This species is a raspberry with biennial stems, it produces a number of new stems each year from the perennial rootstock, these stems fruit in their second year and then die[200]. Plants in this genus are notably susceptible to honey fungus[200]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out. The root pattern is suckering with new plants from underground runners away from the plant [2-1].

5.2.17 Phragmites australis

Common Reed, American common reed, Hybrid common reed, European common reed, Subtropical common reed 4 tin 10 cyuc 5 keak 4 tcan 2 dwat 3.6 m hkuc hmimhtut cyuti tcuphja7nhs6s hwlici hraşljutnyik hpa7tli flatprinklwişslphsom hpa7tmwatli xre7t hjonli

drutta Phragmites australis is a PERENNIAL growing to 3.6 m (11ft) by 3 m (9ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline and saline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can grow in water. The plant can tolerate maritime exposure.

ksakta Edible Parts: Leaves Root Seed Shoots StemEdible Uses: Condiment Drink SweetenerRoot - raw or cooked like potatoes[2, 13, 74, 102, 106, 183]. It contains up to 5% sugar. The flavour and texture are best when the root is young and still growing[144]. It can be dried, ground coarsely and used as a porridge[12, 46, 62]. In Russia they are harvested and processed into starch[269]. Young shoots - raw or cooked[61, 62, 102, 179]. They are best if used before the leaves form, when they are really delicious[144]. They can be used like bamboo shoots[183]. The partly unfolded leaves can be used as a potherb and the Japanese dry young leaves, grind them into a powder and mix them with cereal flour when making dumplings[183]. The stems are reported to contain 4.8 g protein, 0.8 g fat, 90.0 g total carbohydrate, 41.2 g fiber, and 4.4 g ash[269]. Seed - raw or cooked[257]. It can be ground into a powder and used as a flour[57, 62, 102, 106]. The seed is rather small and difficult to remove from the husk but it is said to be very nutritious[183]. A sugar is extracted from the stalks or wounded stems[2, 5, 62, 95]. A sweet liquorice-like taste[95], it can be eaten raw or cooked[62]. The stems can be boiled in water and then the water boiled off in order to obtain the sugar[178]. A sugary gum that exudes from the stems can be rolled into balls and eaten as sweets[183]. A powder extracted from the dried stems can be moistened and roasted like marshmallow[62, 95, 102, 183].

tcanta Alcohol Basketry Biomass Broom Cork Dye Fencing Fertilizer Fibre Fodder Fuel Furniture Green manure Insulation Miscellany Paper Pencil Soil stabilization String

Teeth Thatching WeavingThe common reed can provide a large quantity of biomass and this is used in a wide variety of ways as listed below. Annual yields of 40 - 63 tonnes per hectare have been reported[269]. The plant is also converted into alcohol (for use as a fuel), is burnt as a fuel and is made into fertilizer[238]. The plant is rich in pentosans and may be used for the production of furfural - the nodes and sheaths yield 6.6% whilst the underground parts over 13% of furfural[269]. The pentosan content increases throughout the growing period and is maximum in the mature reed[269]. The reed can be used also for the preparation of absolute alcohol, feed yeast and lactic acid[269]. The stems are useful in the production of homogeneous boards[269]. They can also be processed into a fine fibrous material suitable as a filler in upholstery[269]. The stems have many uses. They are used for thatching roofs[1, 46, 74, 106]. It can last for 100 years[169]. The stems and leaves are also used for building dwellings, lattices, fences, arrows by Indians, and for weaving mats, carrying nets, basket making, insulation, fuel, as a cork substitute etc[13, 74, 99, 102, 115, 257, 269]. The stem contains over 50 percent cellulose and is useful in the manufacture of pulps for rayon and paper[269]. The fibre from the leaves and stems is used for making paper[189]. The fibre is 0.8 - 3.0 mm long and 5.0 - 30.5µm in diameter. The stems and leaves are harvested in the summer, cut into usable pieces and soaked for 24 hours in clear water. They are then cooked for 2 hours with lye and beaten in a blender. The fibre makes a khaki paper[189]. A fibre obtained from the plant is used for making string[95, 106]. The flowering stalks yield a fibre suitable for rope making[269]. The leaves are used in basket making and for weaving mats etc[169, 238]. A light green dye is obtained from the flowers[6, 115]. Freshly cut shoots are a good green manure[74] (Does this man as a soil mulch?[K]). The inflorescences are used as brooms[74]. The plant can be used as a cork substitute[74]. No further details. The plant is mixed with mud to make a plaster for walls[145]. Pens for writing on parchment were cut and fashioned from the thin stems of this reed[269], whilst the stems were also used as a linear measuring device[269]. The plant has a very vigorous and running rootstock, it is useful for binding the soil along the sides of streams etc[115]. It is planted for flood control since it stabilizes the banks and gradually builds up soil depth, thus raising the level of the bank.

dwatta Antiasthmatic Antidiarrhoeal Antidote Antiemetic Antipyretic Antitussive Cholera Depurative Diuretic Febrifuge Febrifuge Lithotropic Miscellany Odontalgic Refrigerant Sedative Sialagogue Skin Stomachic Stypic UrinaryThe leaves are used in the treatment of bronchitis and cholera, the ash of the leaves is applied to foul sores[218]. A decoction of the flowers is used in the treatment of cholera and food poisoning[218]. The ashes are stypic[218]. The stem is antidote, antiemetic, antipyretic and refrigerant[218]. The root is antiasthmatic, antiemetic, antipyretic, antitussive, depurative, diuretic, febrifuge, lithotropic, sedative, sialagogue and stomachic[147, 176, 218, 238]. It is taken internally in the treatment of diarrhoea, fevers, vomiting, coughs with thick dark phlegm, lung abscesses, urinary tract infections and food poisoning (especially from sea foods)[238, 257]. Externally, it is mixed with gypsum and used to treat halitosis and toothache[238]. The root is harvested in the autumn and juiced or dried for use in decoctions[238].

nrakta Cosmopolitan, in most regions of the world, including Britain, but absent from the Amazon Basin. ksacta Shallow water and wet soil, avoiding extremely poor soils and very acid habitats[17].

propta Seed - surface sow in spring in a light position. Keep the soil moist by emmersing the pot in 3cm of water. Germination usually takes place quite quickly. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. Division in spring. Very simple, any part of the root that has a growth bud will grow into a new plant. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Fodder: Bank Industrial Crop: Biomass Minor Global CropA very easily grown plant that thrives in deep moisture retentive soils such as marshes and swamps, whilst it also grows well along the sides of streams, lakes and ponds, in shallow water, ditches and wet wastelands[162, 200, 269].

plants. The bulbs should be planted fairly deeply[1]. A good bee plant[24]. Grows well with most plants, especially roses, carrots, beet and chamomile, but it inhibits the growth of legumes[18, 20, 54]. Helps to reduce the incidence of scab when it is grown under apple trees[201]. This plant is a bad companion for alfalfa, each species negatively affecting the other[201]. Members of this genus are rarely if ever troubled by browsing deer[233].

5.2.31 Carya hybrids

Hybrid and neohybrid hickories

4 tin 11 cyuc 4 keak 3 tcan 3 dwat 40 m hkuc htut cyuti kyuctup hwlici hraşljutnyik hpa7tli flatprinklwis hpa7tmwatli hjonli

drutta Carya hybrids is a deciduous Tree growing to 40 m (131ft) by 35 m (114ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

ksakta Edible Parts: Leaves Oil SeedEdible Uses: Oil-Carbon Farming Solutions - Staple Crop: oil (The term staple crop typically refers to a food that is eaten routinely and accounts for a dominant part of people's diets in a particular region of the world) [1-1].

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

dwatta See individual species.

nrakta Hybrid origin. ksacta Not native propta Seed - requires a period of cold stratification. It is best sown in a cold frame as soon as it is ripe[78]. Stored seed should be kept moist (but not wet) prior to sowing and should be sown in a cold frame as soon as possible[78]. Where possible, sow 1 or 2 seeds only in each deep pot and thin to the best seedling. If you need to transplant the seedlings, then do this as soon as they are large enough to handle, once more using deep pots to accommodate the tap root. Put the plants into their permanent positions as soon as possible, preferably in their first summer, and give them some protection from the cold for at least the first winter[78, K]. Seed can also be sown in situ so long as protection is given from mice etc and the seed is given some protection from cold[200] (a plastic bottle with the top and bottom removed and a wire mesh top fitted to keep the mice out is ideal)

nwatta Management: Standard Minor Global Crop Staple Crop: OilClimate: cold temperate to subtropical, tropical highlands. Humidity: humid. Carbon Farming Solutions - Cultivation: minor global crops. Management: Standard (Describes the non-destructive management systems that are used in cultivation) [1-1]. . For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

5.2.32 Acer saccharum

Sugar Maple, Florida Maple, Hard Maple, Rock Maple

4 tin 8 cyuc 4 keak 4 tcan 2 dwat 30 m hkuc hmimhtut cyuti tcup hwlici hraşljutnyikfrp hpa7tli frusflatprinklwis hpa7tmwatli xre7t hjonli

drutta Acer saccharum is a deciduous Tree growing to 30 m (98ft) by 12 m (39ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from April to May, and the seeds ripen from October to December. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. It can tolerate atmospheric pollution.

ksakta Edible Parts: Inner bark Leaves Sap SeedEdible Uses: SweetenerThe sap contains quite a large proportion of sugar. This can be used as a refreshing drink, or be concentrated into a syrup by boiling off the water[1, 2, 11, 34, 57]. The syrup is used as a sweetener on many foods. The sap can be harvested in late winter or early spring[[142], the flow is best on a warm sunny day after a frost[213]. Trees on southern slopes in sandy soils give the best yields. It is best to make a hole about 7cm deep and about 1.3 metres above the ground[171]. Yields of 40 - 100 litres per tree can be obtained[142]. The best sap production comes from cold-winter areas with continental climates. The sap contains 2 - 6% sugar, thus about 32 litres are required to make a litre of maple syrup[229]. Self-sown seedlings, gathered in early spring, are eaten fresh or dried for later use[213]. Seeds - cooked. The wings are removed and the seeds boiled then eaten hot[62, 105, 159, 213]. The seed is about 6mm long and is produced in small clusters[82]. Inner bark - cooked. It is dried, ground into a powder and then used as a thickening in soups etc or mixed with cereals when making bread[105, 161]. The related Oregon Maple (Acer macrophyllum) has yellow flower clusters, sweet with nectar, eaten raw[183]. No information was found for this species.

tcanta Companion Fodder Fuel Potash Preservative WoodThe leaves are packed around apples, rootcrops etc to help preserve them[18, 20]. Wood - close grained, tough, hard, heavy, strong, not very durable, it takes a high polish, remains smooth under abrasion and has a high shock-resistance[46, 61, 82, 171, 227]. It holds nails well, is fair in gluing, dries easily and shrinks moderately[227]. The wood weighs 43lb per cubic foot[235]. Considered by many to be the most valuable hardwood tree in N. America, the sugar maple is used for a wide range of applications including furniture, flooring, turnery, musical instruments and ship building[46, 61, 82, 171, 227]. Accidental forms with the grain curved and contorted, known as curly maple and bird's eye maple, are common and are highly prized in cabinet making[82]. The wood is also a very good fuel, giving off a lot of heat and forming very hot embers[82, 226]. The ashes of the wood are rich in alkali and yield large quantities of potash[82]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Blood tonic Diuretic Expectorant Hepatic OphthalmicA tea made from the inner bark is a blood tonic, diuretic and expectorant[222]. It has been used in the treatment of coughs, diarrhoea etc[222]. A compound infusion of the bark has been used as drops in treating blindness[257]. The sap has been used for treating sore eyes[257]. The inner bark has been used as an expectorant and cough remedy[257]. Maple syrup is used in cough syrups and is also said to be a liver tonic and kidney cleanser[222].

nrakta Eastern N. America - Newfoundland to Georgia, west to Texas and Minnesota. ksacta Found in a variety of soil types, doing best in deep rich well-drained soils from sea level to 1600 metres[229]. Rich usually hilly woods[43].

propta Seed - best sown as soon as it is ripe in a cold frame, it usually germinates in the following spring. A lot of the seed is non-viable, it is best to cut a few open to see if there is an embryo[113]. An average of 95% germination can be achieved from viable seed[98]. Pre-soak stored seed for 24 hours and then stratify for 2 - 4 months at 1 - 8°C. It can be slow to germinate, sometimes taking two years[125]. The seed can be harvested 'green' (when it has fully developed but before it has dried and produced any germination inhibitors) and sown immediately. It should germinate in late winter. If the seed is harvested too soon it will produce very weak plants or no plants at all[80, 113]. When large enough to handle, prick the seedlings out into individual pots and grow them on until they are 20cm or more tall before planting them out in their permanent positions. Layering, which takes about 12 months, is successful with most species in this genus. Cuttings of young shoots in June or July. The cuttings should have 2 - 3 pairs of leaves, plus one pair of buds at the base. Remove a very thin slice of bark at the base of the cutting, rooting is improved if a rooting hormone is used. The rooted cuttings must show new growth during the summer before being potted up otherwise they are unlikely to survive the winter.

nwatta Agroforestry Services: Crop shade Fodder: Bank Management: Standard Regional Crop Staple Crop: SugarLandscape Uses:Firewood, Screen, Specimen, Street

(clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pocista Although no individual reports regarding this species have been seen, there have been cases of poisoning caused by the consumption, in very large quantities and by some mammals, of certain members of this genus. Dogs seem to be particularly susceptible[76].

kwakta Edible Parts: Flowers Leaves Oil RootEdible Uses: OilLeaves - raw or cooked[1, 15, 46, 52, 88]. A mild flavour, somewhat like a cross between garlic and chives[K], they are delicious in salads[183]. The flavour is destroyed by lengthy cooking[238]. The leaves are available from early spring until late in the autumn[K]. They contain about 2.6% protein, 0.6% fat, 2.4% carbohydrate, 0.95% ash. They also contain small amounts of vitamins A, B1 and C[179]. The rather small bulbs are about 10mm in diameter and are produced in clusters on a short rhizome[200]. Flowers and flower buds - raw or cooked[52, 88, 183]. A delicious flavouring and pretty garnish for the autumn salad bowl[K]. Root - raw or cooked. An edible oil is obtained from the seed[183].

tcanta Oil RepellentThe juice of the plant is used as a moth repellent. The whole plant is said to repel insects and moles[20].

dwatta Antibacterial Cardiac Digestive Stomachic Tonic UrinaryThe whole plant is antibacterial, cardiac, depurative, digestive, stimulant, stomachic and tonic[61, 174, 218]. It is an anti-emetic herb that improves kidney function[238]. It is used internally to treat urinary incontinence, kidney and bladder weaknesses etc[238]. The seed is carminative and stomachic[218]. They are used in India in the treatment of spermatorrhoea[240]. The leaves and the bulbs are applied to bites, cuts and wounds[218].

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

propta Seed - sow spring in a cold frame. The seed has a fairly short viability and should not be used when more than 1 year old[206]. Prick out the seedlings into individual pots when they are large enough to handle - if you want to produce clumps more quickly then put three plants in each pot. Plant out in late summer if the plants have developed sufficiently, otherwise plant them out the following spring. Division in early spring. Very easy, the plants divide successfully at almost any time of the year. The divisions can be planted straight out into their permanent positions if required.

nwatta Landscape Uses:Border, Container, Ground cover, Rock garden. An easily grown plant[203], it prefers a sunny position in a rich moist but well-drained soil[1, 88]. Tolerates most soils[52, 88], including clay[203, 206]. Tolerant of dry soils, established plants also resist drought[190]. Tolerates some shade, even in N.W. England[203]. The roots penetrate up to 50cm into the soil[206]. Tolerates a pH in the range 5.2 to 8.3. This plant succeeds in temperate and tropical climates[90]. It appears to be fully hardy in Britain[90]. Plants tolerate 40 degrees of frost in Manchuria (the report does not say if this is fahrenheit or centigrade)[206]. Plants remain green until temperatures fall below 4 -5°C, they come into new growth in spring when temperatures go above 2 -3°C[206]. Often cultivated for its edible leaves and bulb in the Orient, there are many named varieties[90, 183]. There are two main types of cultivar, one is grown for its leaves and the other for its flowering stem[200, 206]. This species is being increasingly grown as a garden vegetable in Britain[K]. A very ornamental plant, it grows well as an edging plant in the flower garden[K]. Closely related to *A. ramosum*[203]. The bulbs should be planted fairly deeply[1]. Grows well with most plants, especially roses, carrots, beet and chamomile, but it inhibits the growth of legumes[18, 20, 54]. This plant is a bad companion for alfalfa, each species negatively affecting the other[201]. Members of this genus are rarely if ever troubled by browsing deer[233]. Special Features: Edible, Fragrant foliage, Not North American native, Invasive, Suitable for cut flowers, Suitable for dried flowers, Fragrant flowers. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or

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

5.2.30 Allium schoenoprasum sibiricum

Giant Chives

4 tlin 8 cyuc 5 kcaak 2 tcan 2 dwat 0.3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnykrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Allium schoenoprasum sibiricum is a BULB growing to 0.3 m (1ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pocista Although no individual reports regarding this species have been seen, there have been cases of poisoning caused by the consumption, in very large quantities and by some mammals, of certain members of this genus. Dogs seem to be particularly susceptible[76].

kwakta Edible Parts: Flowers Leaves RootEdible Uses: Leaves - raw, cooked or dried for later use. The leaves have a mild onion flavour and are an excellent addition to mixed salads, they can also be used as a flavouring in soups etc[90, 105]. This form has a stronger garlic flavour than common chives[183]. The leaves are often available from late winter and can continue to produce leaves until early the following winter, especially if the plant is in a warm, sheltered position[K]. A good source of sulphur and iron[201]. The bulbs are rather small but can be used as spring onions[K]. They can be harvested with the leaves still attached and be used as spring onions[K]. They have a pleasant mild onion flavour. The flowers can be used as a garnish in salads etc[183]. The flowers of this species are rather dry and less desirable than the flowers of many other species[K].

tcanta Fungicide RepellentThe juice of the plant is used as an insect repellent, it also has fungicidal properties and is effective against scab, mildew etc[14, 18, 20]. The growing plant is said to repel insects and moles[14, 20].

dwatta Appetizer Digestive Hypotensive TonicThe whole plant has a beneficial effect on the digestive system and the blood circulation. It improves the appetite, is digestive, hypotensive and tonic[201]. It has similar properties to garlic (*A. sativum*), but in a much milder form, and it is rarely used medicinally[238].

nrakta N. America to E. Asia - Siberia, Japan. ksacta Calcareous or basic rock, gravels and shores, Alaska and southwards[43].

propta Seed - sow spring in a cold frame. Germination is usually free and easy, put up the seedlings as soon as they are large enough to handle easily and plant out in the following spring. Division can be carried out at almost any time of the year but is probably best done in spring. The clumps should be divided at least every 3 or 4 years in order to maintain vigour[200], the divisions can be planted out direct into their permanent positions.

nwatta An easily grown plant[203], it prefers a sunny position in a rich moist but well-drained soil[14, 37]. Succeeds in most soils[1, 37] and in light shade[203]. Grows well in heavy clay soils[203]. Tolerates a pH in the range 5.2 to 8.3. This is a more robust form of *A. schoenoprasum*, the chive. It is often grown in the garden for its edible leaves which are available from late winter to the beginning of the next winter[K]. The bulbs divide rapidly and large clumps are quickly formed. There are some named varieties[183]. Regular cutting of the leaves ensures a continuous supply of young leaves and prevents flowering[33]. Plants can be moved into a frame or other protected environment in the autumn and will then produce leaves throughout the winter[33]. Do not do this every year or it weakens the

Plants are tolerant of moderately saline water[169, 269]. The plant is reported to tolerate an annual precipitation in the range of 31 to 241cm, an annual temperature in the range of 6.6 to 26.6°C and a pH of 4.8 to 8.2[269]. Plants are hardy to about -20°C[200]. This species is very fast growing with a very vigorous and invasive running rootstock that can be 10 metres or more long, it can form very large stands in wetlands[200, 238, 260]. Difficult to eradicate once established, it is unsuitable for planting into small spaces[200, 238, 269]. The flowering heads are often used in dried flower arrangements[238]. There are some named forms, selected for their ornamental value[238].

5.2.18 Dioscorea batatas

Chinese Yam

4 tlin 11 cyuc 5 kcaak 3 tcan 5 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnykrip hpa7tli flatprikliwis hpa7tmwatli nyanhjen hjonli

drutta Dioscorea batatas is a PERENNIAL growing to 3 m (9ft) by 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from September to October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). . The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pocista Edible species of Dioscorea have opposite leaves whilst poisonous species have alternate leaves[174].

kwakta Edible Parts: Fruit RootEdible Uses: Tuber - cooked[1, 46, 61, 105]. A floury texture[27] with a very pleasant flavour that is rather like a potato[K]. The tubers can be boiled, baked, fried, mashed, grated and added to soups[183]. They store well and for a long time[27, 37] and can also be left in the ground and harvested as required in the winter[K]. This is a top quality root crop, very suitable for use as a staple food[K]. An arrowroot can be extracted from the root[46], though this is not as good at binding other foods as the starch from *D. japonica*[183]. The root contains about 20% starch. 75% water, 0.1% vitamin B1, 10 - 15 mg% vitamin C[174]. Fruit. A starchy flavour, it is said to be very good for the health[206]. We wonder if this report is referring to the tubercles[K]. We've heard the aerial tubers can be eaten and are very tasty. Carbon Farming - Staple Crop: basic starch.

dwatta Anthelmintic Antidote Contraceptive Digestive Miscellany Vitamin CThe Chinese yam, called Shan Yao in Chinese herbalism, is a sweet soothing herb that stimulates the stomach and spleen and has a tonic effect on the lungs and kidneys[238]. The tuber contains allantoin, a cell-proliferant that speeds the healing process[238]. The root is an ingredient of "The herb of eight ingredients", traditionally prescribed in Chinese herbalism to treat hyperthyroidism, nephritis and diabetes[254]. The tuber is anthelmintic, digestive and gently tonic[116, 147, 218, 254]. It is used internally in the treatment of tiredness, weight loss, poor appetite, poor digestion, chronic diarrhoea, asthma, dry coughs, frequent or uncontrollable urination, diabetes and emotional instability[238]. It is applied externally to ulcers, boils and abscesses[218, 238]. The tubers are harvested in the autumn and can be used raw or baked[238]. The leaf juice is used to treat snakebites and scorpion stings[218]. The roots of most, if not all, members of this genus, contains diosgenin[222, 240]. This is widely used in modern medicine in order to manufacture progesterone and other steroid drugs. These are used as contraceptives and in the treatment of various disorders of the genitinary organs as well as in a host of other diseases such as asthma and arthritis[222].

nrakta Temperate E. Asia, though the exact range is not known. ksacta Found in an apparently wild situation in valleys and on the slopes of hills in China[147]. Prefers sunny slopes in the wild[254].

propta Seed - sow March to April in a sunny position in a warm greenhouse and only just cover. It germinates in 1 - 3 weeks at 20°C[175]. Prick out the seedlings as soon as they are large enough to handle and grow on in a greenhouse for their first year. Plant out in late spring as the plant comes

into new growth. Basal stem cuttings in the summer[37]. Division in the dormant season, never when in growth[1]. The plant will often produce a number of shoots, the top 5 - 10 cm of the root below each shoot can be potted up to form a new plant whilst the lower part of the root can be eaten[K]. Tubercles (baby tubers) are formed in the leaf axils. These are harvested in late summer and early autumn when about the size of a pea and coming away easily from the plant. They should be potted up immediately in individual pots in an unheated greenhouse or cold frame, covering them with about 10mm of soil. Protect them from mice etc and keep the soil moist but not wet. They should come into growth in the spring, plant them out in early summer when in active growth[K].

nwatta Management: Standard Minor Global Crop Staple Crop: Basic StarchAn easily grown plant, succeeding in a fertile well-drained soil in a sunny position or light shade[27, 37, 200], though it is best in full sun[160]. Plants are hardy to at least -18°C[160]. This species of yam is much cultivated in China for its edible root which can be up to 1 metre long[1]. It has a great potential to be a commercial crop in Britain, though a satisfactory method of harvesting the root needs to be found[K]. Plants take 3 - 4 years to reach full maturity[160], though one year roots of well grown plants can weigh more than 500g. There are many cultivated forms with different root shapes in China and Japan[174]. The yam is a climbing plant that supports itself by twining around the branches of other plants[219]. It can be grown successfully into small bushes or, perhaps simpler when being grown as a root crop, it can be grown up a frame in a similar manner to growing runner beans[K]. Plants produce tubercles (small tubers that are formed in the leaf axils of the stems), and can be propagated by this means[K]. The small white flowers have a pleasant scent of cinnamon[219]. There is some confusion over the correct name for this species. One report says that *D. batatas* is an invalid name that is often erroneously applied to two distinct species *D. opposita* and *D. japonica*[218]. The Flora of China accepts *D. batatas* as a synonym for *D. polystachya*[266]. Dioecious. Male and female plants must be grown if seed is required. Carbon Farming - Cultivation: regional crop. Management: standard. The plant is heat tolerant in zones 10 through 6. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. Growth habit is a single or multiple shooting vine from a crown [1-2]. Herbaceous. The root pattern is a tap root similar to a carrot going directly down [1-2].

5.2.19 Rubus laciniatus

Oregon Cut-Leaf Blackberry, Cutleaf blackberry

4 tlin 8 cyuc 5 kcaak 1 tcan 0 dwat 2.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnykrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Rubus laciniatus is a deciduous Shrub growing to 2.5 m (8ft 2in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects, Apomictic (reproduce by seeds formed without sexual fusion). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kwakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[3, 34, 101, 257]. Large sweet and juicy with a fine flavour[11, 183]. The fruit is about 20mm in diameter[200].

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

nrakta The origin of this plant is uncertain. ksacta Not known in a truly wild situation.

propta Seed - requires stratification and is best sown in early autumn in a cold frame. Stored seed requires one month stratification at about 3°C and is best sown as early as possible in the year. Prick out the seedlings when they are large enough to handle and grow on in a cold frame. Plant them out into their permanent positions in late spring of the following year. Cuttings of half-ripe wood, July/August in a frame[200]. Tip layering in July. Plant out in autumn. Division in early spring or just before leaf-fall in the autumn[200].

nwatta Easily grown in a good well-drained loamy soil in sun or semi-shade[1, 11, 200]. This species is a blackberry with biennial stems, it produces a number of new stems each year from the perennial rootstock, these stems fruit in their second year and then die[200]. The plant produces apomictic flowers, these produce fruit and viable seed without fertilization, each seedling is a genetic copy of the parent[200]. Sometimes cultivated for its edible fruit, it is a very vigorous and productive plant[3]. There is at least one named variety. 'Oregon Cutleaf Thornless' is high yielding with good flavoured fruits and no prickles on the stems, thus making it easier to harvest[17]. Plants in this genus are notably susceptible to honey fungus[200].

5.2.20 Rubus idaeus

Raspberry, American red raspberry, Grayleaf red raspberry
4 tin 8 cyuc 5 kcaak 3 tcan 3 dwat 2 m hkc
hmimhtut cyutli tcup hwicli hrasljutnyk hpa7tli flatprikliwss hpa7tmwattli fyfxtre7t hjonli

drutta Rubus idaeus is a deciduous Shrub growing to 2 m (6ft) by 1.5 m (5ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in leaf from April to November, in flower from June to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitability pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit Root Shoots StemEdible Uses: Coffee TeaFruit - raw or cooked[2, 5, 7, 61]. Delicious when eaten out of hand, the fruit is also used in pies, preserves etc[183]. Root - cooked. The root, which should be neither too young nor too old, requires a lot of boiling[7]. Young shoots - peeled and eaten raw or cooked like asparagus[172]. They are harvested as they emerge through the ground in the spring and whilst they are still tender. A herb tea is made from the dried leaves[21, 46, 183]. Another report says that a type of tea made from raspberry and blackberry leaves is an excellent coffee substitute[7].

tcanta Cosmetic Dye PaperLandscape Uses: Erosion control, Foundation, Ground cover, Massing, Rock garden, Seashore. ts in this genus are notably susceptible to honey fungus[200]. Special Features: Not North American native, Attracts butterflies, Inconspicuous flowers or blooms. A purple to dull blue dye is obtained from the fruit[168]. A fibre obtained from the stems is used in making paper[189]. The stems are harvested in the summer after the fruit has been eaten, the leaves are removed and the stems are steamed until the fibres can be stripped. The fibres are cooked for 2 hours with lye and then hand beaten with mallets or ball milled for 3 hours. The paper is light brown in colour[189]. A decongestant face-mask made from the fruit is used cosmetically to soothe reddened skin[7].

dwatta Antiinflammatory Astringent Birthing aid Cardiac Decongestant OxytoxicAntiemetic[13, 165]. The leaves and roots are anti-inflammatory, astringent, decongestant, ophthalmic, oxytocic and stimulant[4, 13, 165, 222, 254]. A tea made from them is used in the treatment of diarrhoea, as a tonic for the uterus to strengthen pregnant women, and as an aid in childbirth[4, 222, 257]. The tea has also been shown as effective in relieving painful menstrual cramps[222]. The active ingredients both stimulate and relax the uterus[222]. They can be used during the last three months of pregnancy and during childbirth, but should not be used earlier[238]. Externally, the leaves and roots are used as a gargle to treat tonsillitis and mouth inflammations, as a poultice and wash

to treat sores, conjunctivitis, minor wounds, burns and varicose ulcers[238, 257]. The leaves are harvested in the summer and dried for later use[9]. The fruit is antiscorbutic and diuretic[7]. Fresh raspberry juice, mixed with a little honey, makes an excellent refrigerant beverage to be taken in the heat of a fever[21]. Made into a syrup, it is said to have a beneficial effect on the heart[21].

nrakta Europe, including Britain, from Iceland south and east to Spain and temperate Asia. ksacta Moist neglected land, hedgerows and woodland edges[7, 11, 244].

propta Seed - requires stratification and is best sown in early autumn in a cold frame. Stored seed requires one month stratification at about 3°C and is best sown as early as possible in the year. Prick out the seedlings when they are large enough to handle and grow on in a cold frame. Plant them out into their permanent positions in late spring of the following year. Cuttings of half-ripe wood, July/August in a frame[200]. Tip layering in July. Plant out in autumn. Division in early spring or just before leaf-fall in the autumn[200].

nwatta Prefers a good deep well-drained loamy soil on the acid side[1, 34]. Dislikes very heavy soils[1, 200], light soils[4] and alkaline soils[200]. Prefers an open position but tolerates some shade[1]. Plants crop less well when grown in the shade of trees though they do well in the open on a north-facing slope[200]. Requires a position sheltered from strong winds[200]. Prefers a pH between 6 and 6.5[200]. Raspberries are frequently cultivated in temperate regions of the world, both in the garden and commercially, for their edible fruit. There are many named varieties able to supply fresh fruit from mid-summer to the autumn[1, 200]. High costs of picking the fruit means that little is actually sold fresh, most of the commercially cultivated crops either being used for preserves or grown for the 'Pick Your Own' trade. All the cultivars are self-fertile[200]. This species has biennial stems, it produces a number of new stems each year from the perennial rootstock, these stems fruit in their second year and then die[200]. It is best not to grow raspberries near blackberries or potatoes[18]. PlanFor polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a running thicket former forming a colony from shoots away from the crown spreading indefinitely [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2]. Heat zone: 9-1.

5.2.21 Chenopodium spp.

Perennial quinoa

4 tin 10 cyuc 5 kcaak 2 tcan 3 dwat 2 m hkc
htut cyutli hgatkuyctcup hwicli hysihrasljutnyk hpa7tli frusflatprikliwsslphsomp hpa7tmwattli hjonli

drutta Chenopodium spp. is a PERENNIAL growing to 2 m (6ft) by 0.3 m (1ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitability pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid, very alkaline and saline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure.

pcista The leaves and seeds of all members of this genus are more or less edible. However, many of the species in this genus contain saponins, though usually in quantities too small to do any harm. Although toxic, saponins are poorly absorbed by the body and most pass straight through without any problem. They are also broken down to a large extent in the cooking process. Saponins are found in many foods, such as some beans. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K]. The plants also contain some oxalic acid, which in large quantities can lock up some of the nutrients in the food. However, even considering this, they are very nutritious vegetables in reasonable quantities. Cooking the plants will reduce their content of oxalic acid. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

and lung troubles[240]. The petals are made into a syrup and used in the treatment of infantile disorders[240]. The roots is a much stronger expectorant than other parts of the plant but they also contain the alkaloid violine which at higher doses is strongly emetic and purgative[4, 244, 254]. They are gathered in the autumn and dried for later use[7]. The seeds are diuretic and purgative. They have been used in the treatment of urinary complaints are considered to be a good remedy for gravel[4]. A homeopathic remedy is made from the whole fresh plant[4]. It is considered useful in the treatment of spasmodic coughs and rheumatism of the wrist[4]. An essential oil from the flowers is used in aromatherapy in the treatment of bronchial complaints, exhaustion and skin complaints[238].

nrakta Europe, including Britain, from Norway south and east to N. Africa, W. Asia and Syria. ksacta Fields, hedgerows and woodlands, especially on calcareous soils[7, 17, 31].

propta Seed - best sown in the autumn in a cold frame. The seed requires a period of cold stratification and the germination of stored seed can be erratic. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. Division in the autumn or just after flowering. Larger divisions can be planted out direct into their permanent positions, though we have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring.

nwatta Landscape Uses:Alpine garden, Border, Container, Ground cover, Massing, Rock garden, Woodland garden. Succeeds in most soils but prefers a cool moist well-drained humus-rich soil in partial or dappled shade and protection from scorching winds[1, 14, 31, 200]. When grown in the open it prefers a moderately heavy rich soil[1]. Plants have done very well in a hot dry sunny position on our Cornish trial grounds[K]. Tolerates sandstone and limestone soils. Plants are hardy to about -20°C[187]. Sweet violets are very ornamental plants, there are many named varieties[187]. They produce their delicately scented flowers in late winter and early spring - these are designed for fertilisation by bees and since there are few bees around at this time of year these flowers seldom set seed[4]. However, the plants also produce a second type of flower later in the year. These never open, but seed is produced within them by self-fertilization[4]. The plants will often self-sow freely when well-sited[188]. They can also spread fairly rapidly at the roots when they are growing well[K]. Responds well to an annual replanting in rich loose leafy soils[187]. All members of this genus have more or less edible leaves and flower buds, though those species with yellow flowers can cause diarrhoea if eaten in large quantities[62, 85, 159]. Special Features: Edible, Not North American native, Invasive, Naturalizing, Suitable for cut flowers, Extended bloom season in Zones 9A and above, Fragrant flowers. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. An evergreen. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2].

5.2.28 Fragaria vesca 'Semperflorens'

Alpine Strawberry

4 tin 8 cyuc 5 kcaak 0 tcan 3 dwat 0.3 m hkc
hmimhtut cyutli tcup hwicli hrasljutnykfrtip hpa7tli flatprikliwsslip hpa7tmwattli xre7t hjonli

drutta Fragaria vesca 'Semperflorens' is a PERENNIAL growing to 0.3 m (1ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to November, and the seeds ripen from June to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitability pH: mildly acid,

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

kcakta Edible Parts: Fruit LeavesEdible Uses: Coffee TeaFruit - raw, cooked or made into preserves[183]. Sweet and succulent with an exquisite taste, they are far superior to the cultivated strawberry[K]. The fruit is fairly small, up to 15mm in diameter, but it is produced abundantly from early summer until the frosts of autumn[K]. Young leaves - raw or cooked[52, 105]. Added to salads or used as a potherb[183]. The fresh or dried leaves are used as a tea substitute[7, 177, 183]. The root has been used as a coffee substitute in India[240].

tcanta Compost TeethThe flowers are an alternative ingredient of 'Quick Return' herbal compost activator[32]. This is a dried and powdered mixture of several herbs that can be added to a compost heap in order to speed up bacterial activity and thus shorten the time needed to make the compost[K]. The fruit is used as a tooth cleaner[4]. The fresh fruit removes stains from teeth if it is allowed to remain for about 5 minutes[4]. The fruit is also used cosmetically in skin-care creams[7]. It tones and whitens the skin, combats wrinkles, lightens freckles, soothes sunburn and whitens the teeth[244].

dwatta Astringent Diuretic Laxative TonicThe leaves and the fruit are astringent, diuretic, laxative and tonic[4, 9, 222]. The leaves are mainly used, though the fruits are an excellent food to take when feverish and are also effective in treating rheumatic gout[4]. A slice of strawberry is also excellent when applied externally to sunburnt skin[4]. A tea made from the leaves is a blood tonic[222]. It is used in the treatment of chilblains[53] and also as an external wash on sunburn[222]. The leaves are harvested in the summer and dried for later use[238]. The fruits contain salicylic acid and are beneficial in the treatment of liver and kidney complaints, as well as in the treatment of rheumatism and gout[244]. The roots are astringent and diuretic[4, 222]. A decoction is used internally in the treatment of diarrhoea and chronic dysentery[4, 244]. Externally it is used to treat chilblains and as a throat gargle[244]. The roots are harvested in the autumn and dried for later use[238].

nrakta Most of Europe, including Britain, to temperate Asia. ksacta Woodland and damp undergrowth[7].

propta Seed - sow early spring in a greenhouse. The seed can take 4 weeks or more to germinate. The seedlings are very small and slow-growing at first, but then grow rapidly. Prick them out into individual pots when they are large enough to handle and plant them out during the summer.

nwatta Prefers a fertile, well-drained, moisture retentive soil in a sunny position[27, 200]. Tolerates semi-shade though fruit production will be reduced when plants are growing in such a position. Prefers some shade according to some reports[3, 31]. Plants are often found on clay soils[31] and on soils overlying chalk[13]. Alpine strawberries appreciate a mulch of pine or spruce leaves[18]. The alpine strawberry is often cultivated in the garden for its edible fruit. This fruit is fairly small but exquisitely flavoured and is freely produced from June to November. There are some named varieties[183]. It is not very feasible to grow this plant on a commercial scale because it is very labour intensive to pick and it is also hard to get the fruit to market in good quality. However, it is sometimes grown by specialised growers for the luxury market. The main drawback of growing this plant is that it tends to lose vigour after about 2 - 3 years, partly due to virus diseases and partly because the plant flowers and fruits so freely that it exhausts itself.

5.2.29 Allium tuberosum

Garlic Chives, Chinese chives, Oriental Chives,

4 tin 8 cyuc 5 kcaak 3 tcan 2 dwat 0.3 m hkc
htut cyutli hgatkuyctcup hwicli hrasljutnyk hpa7tli flatprikliwsslip hpa7tmwattli xre7t hjonli

drutta Allium tuberosum is a BULB growing to 0.3 m (1ft) by 0.3 m (1ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from August to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. Suitable for: light (sandy), medium (loamy) and heavy

soil[1], though it prefers a reasonably well-drained and moderately fertile soil in a sunny position[200]. A very ornamental and polymorphic plant[1, 50]. It tends to be quite short-lived in cultivation but usually self-sows when well-sited[233, K]. It is closely related to *M. excisa*[74]. If the plant is cut back to the ground as it comes into flower, then it will produce a fresh flush of leaves for salads[K]. Plants seem to be immune to the predations of rabbits[233] and are seldom bothered by slugs[K]. Plants are prone to infestation by rust fungus[200]. Special Features: Not North American native, Naturalizing, Extended bloom season in Zones 9A and above. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2].

5.2.26 *Fragaria x ananassa*

Strawberry
4 tlin 8 cyuc 5 kcaak 3 tcan 0 dwat 0.3 m hkuc
hmimhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatpriklwis hpa7tmwatli fyfjxre7t hjonli

drutta *Fragaria x ananassa* is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to July, and the seeds ripen from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit - raw. Fruits of the best cultivars are sweet and succulent with an exquisite flavour[K]. Strawberries are a very popular fruit and are widely available in the summer. The fruit of some cultivars is up to 3cm in diameter[200]. Young leaves - raw. tcanta A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

nrakta A hybrid of garden origin, probably *F. virginiana* x *F. chiloensis*. ksacta Not known in the wild.

propta Seed - sow early spring in a greenhouse. The seed can take 4 weeks or more to germinate. The seedlings are very small and slow-growing at first, but then grow rapidly. Prick them out into individual pots when they are large enough to handle and plant them out during the summer. This is a hybrid species and seed will not breed true, though this is the only way to develop new varieties. Division of runners, preferably done in July/August in order to allow the plants to become established for the following years crop[200]. They can also be moved in the following spring if required though should not then be allowed to fruit in their first year. The runners can be planted out direct into their permanent positions.

nwatta Prefers a fertile, well-drained, moisture retentive soil in a sunny position[200]. Tolerates semi-shade though fruit production will be reduced when plants grow in such a position. Strawberries appreciate a mulch of pine or spruce leaves[18]. The strawberry is widely cultivated in temperate areas for its edible fruit, there are many named varieties[183] that can supply fruit from late spring (under clothes) to late autumn. Most strawberry varieties are day-length sensitive and only flower at certain times of the year. However, a number of cultivars have been selected that are not sensitive to day-length and can produce fruit for most of the summer. These cultivars are normally referred to as 'remontants'. The blossom can be damaged by late spring frosts[1]. Oat straw should not be used as a mulch since this can infect the strawberries with stem and bulb eelworm.

Strawberry plants are very subject to virus diseases, these are usually spread by an aphid. Plants tend to degenerate after a few years and need to be replaced. Seed is a safe means of propagation though, since this species is of hybrid origin, the seed will not breed true. Strawberries are a good companion plant, growing well with bush beans, spinach, borage, lettuce and pyrethrum[20]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2].

5.2.27 *Viola odorata*

Sweet Violet, English Violet, Garden Violet, Sweet Violet, Florist's Violet

4 tlin 8 cyuc 5 kcaak 3 tcan 3 dwat 0.1 m hkuc
hmimhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatpriklwis hpa7tmwatli fyfjxre7t hjonli

drutta *Viola odorata* is an evergreen Perennial growing to 0.1 m (0ft 4in) by 0.5 m (1ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf all year, in flower from February to April, and the seeds ripen from April to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Cleistogomy (self-pollinating without flowers ever opening). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista May cause vomiting. Possible additive effect with laxatives [301].

kcakta Edible Parts: Flowers LeavesEdible Uses: Condi- ment TeaYoung leaves and flower buds - raw or cooked[21, 85, 183]. Usually available all through the winter[K]. The leaves have a very mild flavour, though they soon become quite tough as they grow older. They make a very good salad, their mild flavour enabling them to be used in bulk whilst other stronger-tasting leaves can then be added to give more flavour[K]. When added to soup they thicken it in much the same way as okra[62, 85, 159]. Also used as a flavouring in puddings etc. A tea can be made from the leaves[85]. Flowers - raw. Used to decorate salads and desserts[5, 9, 85]. A sweet mild flavour with a delicate perfume, the flowers are an especially welcome decoration for the salad bowl since they are available in late winter[K]. The flowers are also used fresh to flavour and colour confectionery[238]. A soothing tea can be made from the leaves and flowers[85, 183]. A leaf extract is used to flavour sweets, baked goods and ice cream[183].

tcanta Essential LitmusAn essential oil from the flowers and leaves is used in perfumery[57, 100]. 1000kg of leaves produces about 300 - 400g absolute[46]. The flowers are used to flavour breath fresheners[238]. A pigment extracted from the flowers is used as a litmus to test for acids and alkalines[4, 13, 100, 115]. Plants can be grown as a ground cover when spaced about 30cm apart each way[208]. They make an effective weed-excluding cover[K]. ornamental. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Antiinflammatory Antirheumatic Cancer Demulcent Diaphoretic Diuretic Emetic Emollient Expectorant Homeopathy Laxative Purgative UrinarySweet violet has a long and proven history of folk use, especially in the treatment of cancer and whooping cough[4, 165, 218]. It also contains salicylic acid, which is used to make aspirin[244]. It is therefore effective in the treatment of headaches, migraine and insomnia[244]. The whole plant is anti-inflammatory, diaphoretic, diuretic, emollient, expectorant, and laxative[4, 7, 21, 46, 165]. It is taken internally in the treatment of bronchitis, respiratory catarrh, coughs, asthma, and cancer of the breast, lungs or digestive tract[238]. Externally, it is used to treat mouth and throat infections[238]. The plant can either be used fresh, or harvested when it comes into flower and then be dried for later use[4]. The flowers are demulcent and emollient[240]. They are used in the treatment of biliousness

kcakta Edible Parts: Leaves SeedEdible Uses: Edible portion: Leaves, Seeds, Vegetable. Seed - cooked[1, 2, 4, 7, 27, 57, 97]. A pleasant mild flavour, the seed can absorb the flavour of other foods that are cooked with it and so it can be used in a wide variety of ways[K]. The protein is good quality because of its amino acid balance. It has 2-6% more protein and better amino acid balance than wheat. It should be thoroughly soaked and rinsed to remove a coating of saponins on the seed surface. The seed can be used in all the ways that rice is used, as a savoury or sweet dish. It can also be ground into a powder and used as a porridge[37, 183]. The seed can also be sprouted and used in salads[183] though many people find the sprouted seed unpleasant[K]. The seed contains a very high quality protein that is rich in the amino acids lysine, methionine and cystine, it has the same biological value as milk[196]. The seed contains about 38% carbohydrate, 19% protein, 5% fat, 5% sugar[171]. Leaves - raw or cooked[2, 4, 37, 57]. The young leaves are cooked like spinach[183]. It is best not to eat large quantities of the raw leaves, see the notes above on toxicity.

tcanta Gold/green dyes can be obtained from the whole plant[168]. Saponins on the seed can be used as a bird and insect deterrent by spraying them on growing plants[141]. The saponins are obtained by saving the soak-water used when preparing the seed for eating. The spray remains effective for a few weeks or until washed off by rain[K].

dwatta Some medical properties. See individual plants for example: *Chenopodium album*, *Chenopodium ambrosioides*, *Chenopodium ambrosioides anthelminticum*

nrakta *Chenopodium* is a genus of numerous species of perennial or annual herbaceous flowering plants known as the goosefoots, which occur almost anywhere in the world including Africa, Australasia, North America, Europe, and Oceania, (even, apparently in Antarctica). ksacta Varied depending on species.

propta Seed - sow April in situ. The seed can either be sown broadcast or in rows about 25cm apart, thinning the plants to about every 10cm. Germination is rapid, even in fairly dry conditions. Be careful not to weed out the seedlings because they look very similar to some common garden weeds[K].

nwatta Hypothetical Crop Management: StandardClimate: cold temperate to subtropical, tropical highlands. Humidity: humid. A cultivated food crop. A plant of higher elevations in the tropics, it has also been successfully grown in the temperate and subtropical zones. Plants tolerate light frosts at any stage in their development except when flowering[57, 196]. An easily grown plant, it requires a rich moist well-drained soil and a warm position if it is to do really well, but it also succeeds in less than optimum conditions[27, 37]. Tolerates a pH range from 6 to 8.5 and moderate soil salinity[196]. Plants are quite wind resistant[K]. Plants are drought tolerant once they are established[196]. The plant is day-length sensitive and many varieties fail to flower properly away from equatorial regions, however those varieties coming from the south of its range in Chile are more likely to do well in Britain[196]. Different cultivars take from 90 - 220 days from seed sowing to harvest[196]. Yields as high as 5 tonnes per hectare have been recorded in the Andes, which compares favourably with wheat in that area[196]. Young plants look remarkably like the common garden weed fat hen (*Chenopodium album*). Be careful not to weed the seedlings out in error[K]. The seed is not attacked by birds because it has a coating of bitter tasting saponins[141, K]. These saponins are very easily removed by soaking the seed overnight and then thoroughly rinsing it until there is no sign of any soapiness in the water. The seed itself is very easy to harvest by hand on a small scale and is usually ripe in August. Cut down the plants when the first ripe seeds are falling easily from the flower head, lay out the stems on a sheet in a warm dry position for a few days and then simply beat the stems against a wall or some other surface, the seed will fall out easily if it is fully ripe and then merely requires winnowing to get rid of the chaff. Carbon Farming Solutions - Cultivation: hypothetical. Management: standard (Describes the non-destructive management systems that are used in cultivation) [1-1].

5.2.22 *Ribes uva*

Gooseberry, European gooseberry
4 tlin 8 cyuc 5 kcaak 2 tcan 1 dwat 1.2 m hkuc
hmimhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatpriklwis hpa7tmwatli fyfjxre7t hjonli

drutta *Ribes uva-crispa* is a deciduous Shrub growing to 1.2 m (4ft) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from March to May, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The fresh leaves contain the toxin hydrogen cyanide, though details of quantities are not given[240]. This substance is found in several foods, including almonds. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit - raw or cooked[1, 2, 5, 7, 61]. The fruit is often picked when under-ripe and very firm, it has a very tart flavour at this time and is mainly used in making pies, jams etc. However, if the fruit is allowed to remain on the plant until it is fully ripe and soft it becomes quite sweet and is delicious for eating out of hand[K]. The fruit of the wild species is often less than 1cm in diameter, but named cultivars have considerably larger fruits up to 3cm in diameter[K]. Leaves- raw. The young and tender leaves can be eaten in salads[4]. Some caution is advised, see the notes above on toxicity.

tcanta Cosmetic MiscellanyThe fruit pulp is used cosmetically in face-masks for its cleansing effect on greasy skins[7].

dwatta Astringent Dysentery Laxative MiscellanyThe fruit is laxative[7]. Stewed unripe gooseberries are used as a spring tonic to cleanse the system[4]. The leaves have been used in the treatment of gravel[4]. An infusion taken before the monthly periods is said to be a useful tonic for growing girls[4]. The leaves contain tannin and have been used as an astringent to treat dysentery and wounds[7].

nrakta Europe, including Britain, from Scandanavia south and east to N. Africa, Italy and the Caucasus. ksacta Woods and hedges, often by streams[17].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. Stored seed requires 3 months cold stratification at between 0 and 5°C and should be sown as early in the year as possible[113, 164]. Under normal storage conditions the seed can remain viable for 17 years or more. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter, planting them out in late spring of the following year. Cuttings of half-ripe wood, 10 - 15cm with a heel, July/August in a frame[78, 113]. Cuttings of mature wood of the current year's growth, preferably with a heel of the previous year's growth, November to February in a cold frame or sheltered bed outdoors[78, 200].

nwatta Easily grown in a moisture retentive but well-drained loamy soil of at least moderate quality[11, 200]. Growth is often poor in light soils, whilst heavy soils encourage soft growth and excess vigour[200]. Prefers a pH in the range 6 to 6.5[200], though it can grow well in more acid or alkaline soils[K]. It is important to add plenty of humus to chalky soil[K]. Plants are quite tolerant of shade though do not fruit so well in such a position[11]. They can be grown against east or north facing walls[37]. The fruit of plants on north facing walls will ripen later, thus extending the fruiting season, though yields will be lower[K]. Plants dislike very hot weather[37]. Dormant plants are hardy to about -20°C[200], but the flowers and young fruits are susceptible to frost damage. Plants are very susceptible to potash deficiency[1], especially when grown on alkaline soils[K]. Gooseberries are commonly cultivated in temperate regions for their edible fruit, there are many named varieties[183, 200]. Birds love the fruit and so some protection is often required, especially if the fruit is being grown to full ripeness[K]. Plants grow best in cool moist climates such as N. Europe[200]. Plants fruit best on one and two year old wood so any pruning should be

to encourage vigorous new shoots[200]. Plants can harbour a stage of white pine blister rust, so should not be grown in the vicinity of pine trees[155]. Plants in this genus are notably susceptible to honey fungus[200]. The plant is heat tolerant in zones 9 through 2. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

5.2.23 Daucus carota sativus

Carrot
4 tlin 10 cyuc 5 kcaak 4 tcan 3 dwat 1.2 m hkuc
htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyfxre7t hjonli

drutta Daucus carota sativus is a BIENNIAL growing to 1.2 m (4ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies, beetles. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

pcista Carrots sometimes cause allergic reactions in some people[46]. Skin contact with the sap is said to cause photo-sensitivity and/or dermatitis in some people[218].

kcaakta Edible Parts: Leaves RootEdible Uses: Coffee Colouring CondimentRoot - raw or cooked[2, 7, 27]. The roots of well-grown plants are crisp, sweet and juicy, they are very nice raw and are also cooked as a vegetable or added to soups, stews etc[K]. The grated root is a tasty addition to the salad bowl[K]. The juice can be extracted from the root and used as a health-promoting drink[46]. The root is very rich in carotene, which is transformed by the body into vitamin A when it is eaten[7]. The root is sometimes ground into a powder and used in making cakes, bread etc[7, K]. The roasted root is a coffee substitute[21, 46]. Carotin, extracted from the roots, is used as an orange-yellow food dye[171]. Leaves - raw or cooked. A very strong flavour, they can be added in small quantities to mixed salads[K]. The leaves contain an oil that is rich in vitamin E, they are sometimes used as a flavouring in soups[7]. An essential oil from the seed is used as a food flavouring.

tcanta Alcohol Dye EssentialThe roots are fermented in order to produce alcohol[7]. An orange dye is obtained from the root[171]. An essential oil from the seed has a distinctive fragrance and is used in perfumery[7, 46].

dwatta Anthelmintic Carminative Deobstruent Diuretic Galactagogue Ophthalmic StimulantCultivated carrot roots are a rich source of beta-carotene, which is converted to vitamin A by the liver[254]. When used as a regular item in the diet the roots improve eyesight and skin health, and also have anti-cancer effects[238]. A wonderful cleansing medicine, it supports the liver and stimulates urine flow and the removal of waste by the kidneys[254]. The root is diuretic and ophthalmic[7]. The juice of organic carrots is a delicious drink and a valuable detoxifier[254]. The raw root, grated or mashed, is a safe treatment for threadworms, especially in children[254]. The seed is carminative, galactagogue, lithon- triptic and stimulant[7, 240]. They are useful in the treatment of kidney diseases, dropsy and to settle the digestive system[240, 254]. They stimulate menstruation and have been used in folk medicine as a treatment for hangovers[254].

nrakta A cultivated form of *D. carota*. ksacta Not known in the wild.

propta Seed - sow in situ in succession from early spring to early summer. Do not transplant the seedlings, since this will usually cause damage to the roots and a good crop will not be obtained. Carrot seed needs a well-made seed bed with a fine tilth if good germination is to be achieved. The earliest sowings can be made of an early maturing variety in a cold frame or greenhouse in January or February, this will provide edible roots in late spring. The first outdoor sowings are made as the soil warms up in the spring. Successional sowings can be made until early summer if required. A September sowing in mild areas can provide an early spring supply of young roots, though the plants will often require some protection.

nwatta Prefers a good light warm well-drained soil and plenty of moisture[16, 27, 37, 200]. Prefers a sandy or calcareous loam[132]. Plants are extremely sensitive to soil conditions, good roots can only be produced in a soil that permits easy penetration of the root[200]. Carrots are reported to tolerate an annual precipitation in the range of 31 to 410cm, an annual temperature range of 3.6 to 28.5°C and a pH of 4.2 to 8.7[269]. They prefer a pH in the range 6.5 to 7.5[200]. Carrots are widely cultivated in most areas of the world for their edible root, which can be available all year round from successional sowings[46]. There are many named varieties, with roots varying in size and shape from short and round to long and tapering[183, 200]. World-wide, the yields of roots averages about 24 tonnes per hectare, the world low production yield was 3,125 kg/ha in Zaire, whilst the world high production yield was 62,889 kg/ha in Belgium-Luxembourg[269]. Plants grow best at a mean temperature of 16 - 18°C. At temperatures above 28°C top growth is reduced and the roots become very strongly flavoured. At temperatures below 16°C the roots become long and tapered and are pale in colour[200]. The leaves are moderately susceptible to frost but the roots are much harder and can safely be left in the ground in the winter in most areas[200], so long as pests such as slugs or root fly are not a problem[K]. If dug up for storage, the roots can be kept for up to six months at 0 - 1°C and high relative humidity[200]. Carrots are very susceptible to a number of pests and diseases. The young seedlings are adored by slugs and so will generally need some protection. Carrot root fly is also a major problem. This creature lays its eggs near the young carrots. When they hatch, the larvae burrow into the soil and then eat their way into the root. In bad seasons almost all the crop can be heavily damaged. It is possible to reduce this damage by timing seed sowing to try and avoid the worst times of infestation, a June sowing of a fast-maturing cultivar will often be successful. There are also various companion plants that can help to reduce infestation. In general, these are strong-smelling plants such as garlic, onions and various aromatic plants such as wormwood. The idea is that these plants will mask the smell of the carrots and therefore the fly, which mainly uses scent to find the plants, will not be able to detect the smell of the carrots This method is most likely to fail when the fly comes close enough to the plants to see them and then no longer relies on scent. The most successful organic solution to date has been to erect barriers of clear polythene about 1 metre tall all around the bed of carrots. Since the fly generally flies below this height, it has proved to be quite effective, although any fly that does get in will then tend to stay inside the barrier and lay all of its eggs there. About 95% of carrot flowers are pollinated by insects, with the remaining 5% self-pollinating[269]. Carrots grow well with lettuce and chives[18] but dislike dill[20]. They also grow badly with potatoes, kohlrabi, fennel and cabbages[201]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fleshy. Thick or swollen - fibrous or tap root [1-1].

5.2.24 Ribes nigrum

Blackcurrant, European black currant
4 tlin 8 cyuc 5 kcaak 2 tcan 3 dwat 1.8 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyfxre7t hjonli

drutta Ribes nigrum is a deciduous Shrub growing to 1.8 m (6ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf from March to Novem-

ber, in flower from April to May, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcaakta Edible Parts: Fruit LeavesEdible Uses: TeaFruit - raw or cooked. An excellent aromatic flavour[K]. The fully ripe fruit is very acceptable raw, though it is more often cooked and used to make pies, jams etc[1, 2, 5, 9, 34]. Very rich in vitamin C[244]. The fruit is about 10mm in diameter[200], though selected cultivars have larger fruits[K]. The leaves are used in soups[183]. The dried leaves are a tea substitute[74, 177, 183]. They are sometimes added to blended herb teas[238].

tcanta Cosmetic Dye Miscellany PreservativeThe oil from the seed is added to skin preparations and cosmetics. It is often combined with vitamin E to prevent oxidation[238]. A yellow dye is obtained from the leaves[100]. A blue or violet dye is obtained from the fruit[100]. The leaves are used for vegetable preservation[74]. No more details.

dwatta Anti diarrhoeal Antirheumatic Diaphoretic Diuretic Febrifuge Miscellany Vitamin CBlackcurrant fruits are a good source of minerals and vitamins, especially vitamin C. They have diuretic and diaphoretic actions, help to increase bodily resistance to infections and are a valuable remedy for treating colds and flu[4, 254]. The juice, especially when fresh or vacuum-sealed, helps to stem diarrhoea and calms indigestion[4, 254]. The leaves are cleansing, diaphoretic and diuretic[4, 9]. By encouraging the elimination of fluids they help to reduce blood volume and thereby lower blood pressure[254]. An infusion is used in the treatment of dropsy, rheumatic pain and whooping cough, and can also be used externally on slow-healing cuts and abscesses[9]. It can be used as a gargle for sore throats and mouth ulcers[254]. The leaves are harvested during the growing season and can be used fresh or dried[238]. It is believed that an infusion of the leaves increases the secretion of cortisol by the adrenal glands, and thus stimulates the activity of the sympathetic nervous system[254]. This action may prove useful in the treatment of stress-related conditions[254]. An infusion of the young roots is useful in the treatment of eruptive fevers[4]. A decoction of the bark has been found of use in the treatment of calculus, dropsy and haemorrhoidal tumours[4]. The seed is a source of gamma-linolenic acid, an unsaturated fatty acid which assists the production of hormone-like substances[238]. This process is commonly blocked in the body, causing disorders that affect the uterine muscles, nervous system and metabolism[238]. We have no records of the oil from this species being used medicinally, though it is used in cosmetic preparations[238, K].

nrakta Europe, including Britain, from Scandinavia south and east to France, Bulgaria, N. and C. Asia. ksacta Hedges and woodlands, often by streams[9, 17].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. Stored seed requires 3 months cold stratification at between 0 and 5°C and should be sown as early in the year as possible[113, 164]. Under normal storage conditions the seed can remain viable for 17 years or more. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter, planting them out in late spring of the following year. Cuttings of half-ripe wood, 10 - 15cm with a heel, July/August in a frame[78, 113]. Cuttings of mature wood of the current year's growth, preferably with a heel of the previous year's growth, November to February in a cold frame or sheltered bed outdoors[78, 200].

nwatta Easily grown in a moisture retentive but well-drained loamy soil of at least moderate quality[11, 200]. Best grown on a deep sandy loam[1]. Dislikes very heavy clay, chalky soils and thin dry soils, but it can succeed on most soil types if plenty of organic matter is incorporated[1]. Plants require plenty of nitrogen if they are to do well[200]. Prefers a pH in the range 6.7 to 7 and is intolerant of acid soils[200]. Plants are quite tolerant of shade though do not fruit so well in such a position[11]. Plants fruit less freely when grown in windy sites[200]. The plant is hardy to about -20°C, though flowers are damaged at -1°C[200]. Blackcurrants are widely cultivated in temperate areas for their edible fruit, there are many named varieties[183, 200]. Most fruit is produced on

one year old wood. Pruning usually consists of removing about a third of all the stems from just above ground level in the autumn. The oldest stems with least new growth are removed since these will be the poorest fruiterers. The plant is able to make new growth from the base of the removed stems and, if the plants are well fed, this growth is very vigorous and will fruit heavily the following year. The flowers can self-fertilize but many cultivars fruit better with insect pollination[200]. Plants can harbour a stage of 'white pine blister rust', so they should not be grown in the vicinity of pine trees[155]. Plants in this genus are notably susceptible to honey fungus[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out. The root pattern is suckering with new plants from underground runners away from the plant [2-1].

5.2.25 Malva alcea

Vervain mallow, Hollyhock Mallow
4 tlin 8 cyuc 5 kcaak 2 tcan 1 dwat 1.2 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Malva alcea is a PERENNIAL growing to 1.2 m (4ft) by 0.8 m (2ft 7in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from July to October, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although we have seen no reports of toxicity for this species, when grown on nitrogen rich soils (and particularly when these are cultivated inorganically), the leaves of some species tend to concentrate high levels of nitrates in their leaves[76]. The leaves are perfectly wholesome at all other times.

kcaakta Edible Parts: Flowers Leaves Oil SeedEdible Uses: Oil OilLeaves - raw or cooked[74]. A mild pleasant flavour[K]. The leaves are mucilaginous and fairly bland, this is a very good perennial substitute for lettuce in a salad, producing fresh leaves from spring until the middle of summer, or until the autumn from self-sown plants[K]. Flowers - raw[K]. A very decorative addition to the salad bowl, they have a mild flavour and a texture similar to the leaves[K]. Seed - raw[74]. Best used before it is fully mature, the seed has a pleasant nutty taste but it is rather small and fiddly to harvest[K].

tcanta Dye Fibre Oil OilA fibre obtained from the stem is used for making cordage[74]. Cream, yellow and green dyes can be obtained from the plant and the seed heads[168]. The seed yields 15% oil[74]. The uses of this oil have not been given though it is almost certainly edible[K].

dwatta Demulcent MouthwashThe leaves are demulcent. They are also used as a mouthwash for inflammatory and catarrhal conditions[74].

nrakta Europe. An occasional casual in Britain. ksacta Gardens, vineyards and waste places[74].

propta Seed - best sown in early spring in a cold frame. The seed germinates quickly and easily. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in their permanent positions in the early summer[K]. If you have sufficient seed then it can be sown outdoors in situ in the middle to late spring. Basal cuttings in late spring. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Landscape Uses:Border, Container, Massing. A very easily grown plant, succeeding in ordinary garden

nwatta Succeeds in most soils[1], including dry ones, preferring a rich moist soil and a sunny position[111] but tolerating partial shade[88]. Plants flower less freely in a shady position though the flowers can last longer in such a position[205]. Grows well in heavy clay soils. Succeeds in short grass if the soil is moist[1]. Prefers a pH between 6 and 7[200]. A very cold-hardy plant, tolerating temperatures down to about -25°c[187]. The roots are slender and not swollen[187]. The scapes carry between 4 and 12 blooms[205]. Hybridizes freely with other members of this genus[200]. It is closely related to *H. vespertina* Hara.[58]. Plants take a year or two to become established after being moved[200]. Plants seem to be immune to the predations of rabbits[233]. The plants are very susceptible to slug and snail damage, the young growth in spring is especially at risk[200].

5.2.110 Malva neglecta

Dwarf Mallow, Common mallow

4 tin 8 cyuc 4 kcaok tcan 2 dwat 0.6 m hkuc hmimhut cyutli kyucutcp hwicli hraslutnyik hpa7ti flat-prikliws hpa7tmwatli fyfxre7t hjonli

drutta Malva neglecta is a ANNUAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to September, and the seeds ripen from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista When grown on nitrogen rich soils (and particularly when these are inorganic), the plant tends to concentrate high levels of nitrates in its leaves[76]. The leaves are perfectly wholesome at all other times.

kcaкта Edible Parts: Leaves SeedEdible Uses: Egg TeaLeaves and young shoots - raw or cooked[2, 9, 13, 74, 85]. A mild pleasant flavour[K], they are said to be highly nutritious[222]. They can be added in quantity to salads, and make an excellent lettuce substitute, they can also be cooked as greens[183, K]. The leaves are mucilaginous, when cooked in soups etc they tend to thicken it in much the same way as okra (*Abelmoschatus esculenta*)[222]. Some people find this mucilaginous texture unpleasant, especially if the leaves are cooked[K]. Immature seeds - raw or cooked[74, 85, 183]. A pleasant nutty flavour, they are nice as a nibble but too small for most people to want to collect in quantity[K]. A decoction of the roots is used as an egg-white substitute for making meringue[183]. The roots are brought to the boil in water and then simmered until the water becomes quite thick. This liquid can then be whisked in much the same way as egg whites[K]. A tea can be made from the dried leaves[85, 183].

tcaкта Dye TeethCream, yellow and green dyes can be obtained from the plant and the seed heads[168]. The root is used as a toothbrush[74].

dwatta Antiinflammatory Antiphlogistic Astringent Demulcent Diuretic Emollient Expectorant Laxative Poulitce Purgative Salve UrinaryAll parts of the plant are antiphlogistic, astringent, demulcent, diuretic, emollient, expectorant, laxative, salve[9, 222, 238]. The leaves and flowers can be eaten as part of the diet, or a tea can be made from the leaves, flowers or roots[222]. The leaves and flowers are the main part used, their demulcent properties making them valuable as a poulitce for bruise, inflammations, insect bites etc, or taken internally in the treatment of respiratory system diseases or inflammation of the digestive or urinary systems[222, 238]. They have similar properties, but are considered to be inferior to the marsh mallow (*Althaea officinalis*), though they are stronger acting than the common mallow (*M. sylvestris*). They are seldom used internally[4]. The plant is an excellent laxative for young children[7].

nrakta Most of Europe, including Britain, south and east to N. Africa and Asia. ksacta Waste and cultivated ground[17], usually on dry soils, frequently in coastal habitats, on dry walls or as a weed of cultivated ground[200].

propta Seed - sow early spring or autumn in situ. Germination should take place within 2 weeks. The seed germinates in the autumn in the wild.

nwatta A very easily grown plant, succeeding in ordinary garden soil, though it prefers a reasonably well-drained and moderately fertile soil in a sunny position. It also succeeds in dry soils. At one time this plant was often cultivated for its edible leaves[2]. Plants seem to be immune to the predations of rabbits[233]. Prone to infestation by rust fungus.

5.2.111 Tilia heterophylla

White Basswood, American basswood

4 tin 8 cyuc 3 kcaok tcan 2 dwat 30 m hkuc hmimhut cyutli tcup hwicli hraslutnyik hpa7ti flatprikliws hpa7tmwatli xre7t hjonli

drutta Tilia heterophylla is a deciduous Tree growing to 30 m (98ft 5in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in July, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcaкта Edible Parts: LeavesEdible Uses: TeaYoung leaves - raw. A nice mild flavour with a slightly mucilaginous texture[K]. They go well in a mixed salad, though I have found that on their own they tend to leave a slightly rough feeling in the throat[K]. The dried flowers make a refreshing tea substitute[159]. A very good chocolate substitute is made from a paste of the ground fruits and flowers[2]. Trials on marketing the product failed because the paste decomposes readily[2].

tcanta Fibre WoodA fibre is obtained from the tough inner bark It can be made into diverse items such as rope, mats, shoes and coarse cloth[229, 257]. Wood - soft, light, weak, straight grained[229, 235]. It weighs 26lb per cubic foot[235]. Widely used in interior finishing, cabinet making, woodenware, paper making and for piano keyboards[229].

dwatta Antispasmodic Diaphoretic Dysentery Poulitce SedativeA tea made from the flowers is antispasmodic, diaphoretic and sedative[226]. A decoction of the inner bark has been used in the treatment of dysentery[257]. A decoction of the bark, mixed with cormeal, has been used as a poulitce in the treatment of boils[257]. A decoction of the inner bark and twigs has been used during pregnancy to treat heartburn, weak stomach and weak bowels[257].

nrakta Eastern N. America - New York to Florida. ksacta Buffs and slopes of ravines and by streams[159]. Found in rich woods in the Appalachians[43].

propta Seed - much of the seed produced in Britain is not viable, cut a few seedcases open to see if there is a seed inside[80]. If possible, obtain fresh seed that is ripe but has not as yet developed a hard seed coat and sow it immediately in a cold frame. It may germinate in the following spring though it could take 18 months[80]. Stored seed can be very slow to germinate. It has a hard seed coat, embryo dormancy and a hard coat on the pericarp. All these factors mean that the seed may take up to 8 years to germinate[80]. One way of shortening this time is to stratify the seed for 5 months at high temperatures (10°c at night, up to 30°c by day) and then 5 months cold stratification[80]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Layering in spring just before the leaves unfurl. Takes 1 - 3 years[78]. Suckers, when formed, can be removed with as much root as possible during the dormant season and replanted immediately[200].

nwatta Prefers a good moist loamy alkaline to neutral soil but succeeds on slightly acid soils[11, 200]. Grows poorly on any very dry or very wet soil[200]. Dislikes exposed positions[200]. Succeeds in sun or semi-shade[188]. A moderately fast growing and long-lived species in the wild[229]. It prefers a continental climate, growing more slowly and not producing fertile seed in areas with cool summers[200]. It is fairly susceptible to forest fires because it has a thin bark[229]. Lime trees tend to hybridise freely if other members of the genus are growing nearby[238]. If growing plants from seed it is important to ensure the seed came from a wild source or from an isolated clump of the single species[K]. Grows best in a woodland situation, young plants tolerate

drutta *Crataegus submollis* is a deciduous Tree growing to 7 m (23ft) by 7 m (23ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in June, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Midgees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcaкта Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 161]. Sub-acid, dry and mealy[82]. Our experience has been that the fruit is sweet and somewhat juicy, it has a thick flesh with a nice flavour and makes an acceptable dessert fruit[K]. The fruit can also be used in making pies, preserves etc, and can be dried for later use[257]. It is about 20mm in diameter, is borne in large clusters and is easily harvested[K]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Hedge HedgePlants are very tolerant of trimming and will soon resprout even if cut back into very old wood. They can be used as a hedge[50]. Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta North-eastern N. America - Quebec to Ontario, Massachusetts and New York. ksacta Wooded hillsides and open fertile ground[43]. Rich damp hillsides and the borders of woods and roads[82].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°c and then cold stratified for another 3 months at 4°c[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Plants are hardy to about -18°c[202]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245].

Seedlings should not be left in a seedbed for more than 2 years without being transplanted[111]. This species is sometimes confused with *C. coccinea*[50]. It is also very close to *C. mollis*, differing in having 10 stamens to a flower (as compared to 20 in *C. mollis*)[202]. It is considered to be part of *C. mollis* by some botanists[229].

5.2.51 Crataegus succulenta

Fleshy hawthorn

4 tin 8 cyuc 4 kcaok 2 tcan 2 dwat 6 m hkuc hmimhut cyutli hgatkyuctcuphja7n hwicli hraslutnyikfrip hpa7ti flatprikliwsslip hpa7tmwatli xre7t hjonli

drutta *Crataegus succulenta* is a deciduous Shrub growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Midgees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcaкта Edible Parts: FruitEdible Uses: Fruit - raw or cooked[62, 101, 105]. Excellent for making jellies[183], it can also be dried for later use. A small fruit with a sweet, juicy and pulpy flesh[82, 183], it is up to 17mm in diameter[235]. Another report says that the fruit is large for a *Crataegus* species, it is about 35mm in diameter and is borne in small clusters[200]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use.

The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta Eastern N. America - Nova Scotia to North Carolina, west to Montana, Colorado and Utah. ksacta Thickets, pastures and woodland edges, especially in dry or rocky soils[43].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°c and then cold stratified for another 3 months at 4°c[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit,

they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. This species is closely related to *C. tomentosa*[11].

5.2.52 *Pyrus bretschneideri*

4 tlin 8 cyuc 4 kcaak 0 tcan 0 dwat 6 m hkuc hmimhtut cyutli hgattcup hwicli hrasljutnyikfrip hpa7tli flat-prikklwis hpa7tmwatli xre7t hjonli

drutta *Pyrus bretschneideri* is a deciduous Tree growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in May, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[177, 200]. The fruit is up to 3cm in diameter[200].

nrakta E. Asia - N. China. ksacta Slopes, dry cold regions at elevations of 100 - 2000 metres[266].

propta Seed - best sown in a cold frame as soon as it is ripe in the autumn, it will then usually germinate in mid to late winter. Stored seed requires 8 - 10 weeks cold stratification at 1°C and should be sown as early in the year as possible[200]. Temperatures over 15 - 20°C induce a secondary dormancy in the seed[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for their first year. Plant them out in late spring or early summer of the following year.

nwatta Prefers a good well-drained loam in full sun[200]. Grows well in heavy clay soils. Tolerates light shade but does not fruit so well in such a position. Tolerates atmospheric pollution, excessive moisture and a range of soil types if they are moderately fertile[200]. Established plants are drought tolerant[200]. Plants are hardy to at least -15°C[200]. This species is closely related to *P. ussuriensis ovoidea*[200]. This species is commonly cultivated in northern China, preferring sunny, dry, loamy soils. It includes many important forms with excellent fruit[266]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2].

5.2.53 *Sanguisorba minor*

Salad Burnet, Small burnet

4 tlin 8 cyuc 4 kcaak 3 tcan 2 dwat m hkuc htut cyutli tcup hwicli hyishrasljutnyik hpa7tli flatprikklwislip hpa7tmwatli fyifxre7t hjonli

drutta *Sanguisorba minor* is an evergreen Perennial growing to 0.6 m (2ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf all year, in flower from May to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: LeavesEdible Uses: TeaYoung leaves and shoots - raw or cooked[2, 5, 9, 14, 21]. They are

best used before the plant comes into flower[9]. Eaten in salads, used as a garnish or added to soups, cooling drinks and claret cups[183]. Young seedlings are boiled and eaten[183]. A bit fiddly to harvest and the leaves sometimes become bitter in hot dry summers, but they are usually fairly mild tasting in the winter and some people detect a cucumber flavour to them[K]. In the acid soil of our Cornish trial grounds, the leaves have a distinctly bitter flavour, though when the same plants were grown on a chalky soil they had a much milder flavour[K]. The leaves contain about 5.65% protein, 1.2% fat, 11% carbohydrate, 1.7% ash, 74.5% water[179]. A herb tea is made from the dried leaves[21, 183].

tcanta Soil reclamation Soil stabilizationPlants have extensive root systems and are used for erosion control, they are also used to reclaim landfills and mined-out terrain[160]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Astringent Diaphoretic Eczema Skin StypticBoth the root and the leaves are astringent, diaphoretic and styptic, though the root is most active[4]. The plant is an effective wound herb, quickly staunching any bleeding[244]. An infusion is used in the treatment of gout and rheumatism[244]. The leaves can be used fresh, or are harvested in July and dried (the plant should be prevented from flowering)[4]. The root is harvested in the autumn and dried[4]. An infusion of the leaves is used as a soothing treatment for sunburn or skin troubles such as eczema[201].

nrakta Europe, including Britain, from Sweden south and east to France, Armenia and Iran. ksacta Grassland, usually on calcareous soils[9, 17, 37].

propta Seed - sow March/April or September/October in a cold frame. Germinates in 3 weeks. Prick out the seedlings when they are large enough to handle into individual pots. Plant them out in the spring or early summer. The seed can also be sown in situ in spring or autumn if you have sufficient seed. Division in spring.

nwatta Prefers a light dry calcareous soil[1, 37, 200] but succeeds in most good soils[1, 37]. Plants also succeed in poor soils[4]. One report says that it grows well in marshy soil[24] but this is possibly a mistake[K]. Dislikes shade[14]. Occasionally cultivated in the herb garden, this is an evergreen herbaceous plant and it supplies fresh edible leaves all the year round, even in quite severe winters[K]. When grown as a salad, the plant should be prevented from flowering[4]. Grows well in the spring meadow[24]. Makes a good edging plant in the border[200]. Plants often self-sow, sometimes to the point of nuisance[K]. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

5.2.54 *Morus alba multicaulis*

White Mulberry

4 tlin 8 cyuc 4 kcaak 0 tcan 3 dwat m hkuc hmimhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikklwis hpa7tmwatli fyif hjonli

drutta *Morus alba multicaulis* is a deciduous Tree growing to 18 m (59ft 1in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in May, and the seeds ripen from July to August. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

5.2.108 *Origanum vulgare hirtum*

Greek Oregano

4 tlin 8 cyuc 4 kcaak 3 tcan 3 dwat 0.6 m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasljutnyik hpa7tli flat-prikklwis hpa7tmwatli xre7t hjonli

drutta *Origanum vulgare hirtum* is a PERENNIAL growing to 0.6 m (2ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate strong winds but not maritime exposure.

kcakta Edible Parts: LeavesEdible Uses: CondimentLeaves - raw or cooked as a potheb[5, 52, 183]. Oregano is an important flavouring herb in Mediterranean cookery, and is often used dried rather than fresh[238]. This sub-species has a much stronger flavour than the type[238]. The leaves are used as a flavouring for salad dressings, vegetables and legumes, and are frequently included in strongly flavoured dishes with chillies, garlic, onions etc[2, 13, 21, 27, 183, 238]. A nutritional analysis is available[218]. Much of the commercially available dried oregano does not come from this plant but from a number of different, often unrelated plants[238]. These include *Lippia graveolens*, *L. palmeri* and *Origanum syriacum*[238]. A herb tea is made from the dried leaves and flowering stems[183, 207, 238].

tcanta Dye Essential RepellentAn essential oil from the plant is used as a food flavouring, in soaps and perfumery[115, 171]. A red or purple dye is obtained from the flowering tops[4, 7, 13, 100], it is neither brilliant nor durable[115]. The plant repels ants[46]. A useful ground cover for sunny positions, forming a slowly spreading clump[197, K].

dwatta Antiseptic Antispasmodic Carminative Cholagogue Diaphoretic Emmenagogue Expectorant Stimulant Stomachic TonicOregano has been used as a culinary and medicinal herb for thousands of years. It has a beneficial effect upon the digestive and respiratory systems and is also used to promote menstruation[254]. It should not be used medicinally by pregnant women though it is perfectly safe in small amounts for culinary purposes[254]. The leaves and flowering stems are strongly antiseptic, antispasmodic, carminative, cholagogue, diaphoretic, emmenagogue, expectorant, stimulant, stomachic and mildly tonic[4, 7, 9, 21, 254]. The plant is taken internally in the treatment of colds, influenza, mild feverish illnesses, indigestion, stomach upsets and painful menstruation[238]. It is strongly sedative and should not be taken in large doses, though mild teas have a soothing effect and aid restful sleep[244]. It should not be prescribed for pregnant women[238]. Externally, oregano is used to treat bronchitis, asthma, arthritis and muscular pain[238]. The plant can be used fresh or dried - harvest the whole plant (but not the roots) in late summer to dry and store for winter use[244]. Oregano is often used in the form of an essential oil that is distilled from the flowering plant[4]. A few drops of the essential oil, put on cotton wool and placed in the hollow of an aching tooth, frequently relieves the pain of toothache[4, 207]. This plant is one of the best natural antiseptics because of its high thymol content[7]. The essential oil is used in aromatherapy to treat the same kinds of complaints that the herb is used for[238].

nrakta S. Europe - Greece. ksacta Dry places in mountain regions in bushy places and on stony ground[50, 148].

propta Seed - sow early spring at 10 - 13°C and only just cover the seed. Germination usually takes place within 2 weeks. Prick out the seedlings into individual pots when they are large enough to handle and plant them out into their permanent positions in early summer. The seed can also be sown in situ in late spring. Division in March or October. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer. Basal cuttings of young barren shoots in June. Very easy. Harvest the shoots

with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Requires a rather dry, warm, well-drained soil in full sun, but is not fussy as to soil type, thriving on chalk[1, 27]. Prefers slightly alkaline conditions[200]. Tolerates poor soils[24]. Dislikes wet soils[37]. Often cultivated as a culinary herb, this is a sub-species from Greece, its flowers are white and it has a stronger fragrance. It is more commonly grown commercially because of its stronger fragrance. There are some named forms[183]. Plants growing near the sea have the most fragrance[7]. A good companion plant, improving the flavour of nearby plants. The flowers are very attractive to bees and butterflies[5, 30]. A good companion for the cucumber family[14], it is beneficial to all nearby plants[20]. The whole plant is strongly aromatic. Members of this genus are rarely if ever troubled by browsing deer[233]. The plant is heat tolerant in zones 10 through 2. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

5.2.109 *Hemerocallis yezoensis*

4 tlin 8 cyuc 4 kcaak 0 tcan 1 dwat 0.8 m hkuc hmimhtut cyutli kyuctcup hwicli hrasljutnyikfrip hpa7tli flat-prikklwis hpa7tmwatli xre7t hjonli

drutta *Hemerocallis yezoensis* is a PERENNIAL growing to 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to June. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Large quantities of the leaves are said to be hallucinogenic. Blanching the leaves removes this hallucinatory component[205]. (This report does not make clear what it means by blanching, it could be excluding light from the growing shoots or immersing in boiling water[K].)

kcakta Edible Parts: Flowers LeavesEdible Uses: Leaves and young shoots - cooked[105, 177]. They must be consumed when very young or else they become fibrous[K]. Flowers and flower buds - raw or cooked[205]. The flowers can be dried and used as a thickener in soups etc. The flower buds contain about 43mg vitamin C per 100g, 983 IU vitamin A and 3.1% protein[205].

tcanta WeavingThe tough dried foliage is plaited into cord and used for making footwear[205].

dwatta Antidote Diuretic Vitamin CThe juice of the roots is an effective antidote in cases of arsenic poisoning[205]. A tea made from the boiled roots is used as a diuretic[205].

nrakta E. Asia - China, Japan, Korea. ksacta Grassy places and marshy meadows near the sea[187].

propta Seed - sow in the middle of spring in a greenhouse. Germination is usually fairly rapid and good. Prick out the seedlings into individual pots when they are large enough to handle. Grow the plants on for their first winter in a greenhouse and plant out in late spring[K]. Division in spring or after flowering in late summer or autumn[200]. Division is very quick and easy, succeeding at almost any time of the year[K]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

short grass if the soil is moist[1]. Prefers a pH between 6 and 7[200]. Plants are very cold-hardy, tolerating temperatures down to about -25°c[187]. A very vigorous plant, spreading by underground rhizomes[1]. The plant has a fibrous root system with occasional spindle-like swellings[205]. Cultivated as a food and medicinal plant in Japan[127]. Individual flowers are short-lived, they open at night and last for 20 - 76 hours. The plant produces a succession of blooms over a period of about 2 months[205]. The flowers are fragrant[205]. The flowers have a honeysuckle-like scent and this can pervade the air for a considerable distance when warmed by the summer sunshine[245]. Hybridizes freely with other members of this genus[200]. Plants take a year or two to become established after being moved[200]. Plants seem to be immune to the predations of rabbits[233]. The plants are very susceptible to slug and snail damage, the young growth in spring is especially at risk[200]. The plant is heat tolerant in zones 12 through 2. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2]. The root pattern is tuberous with swollen potato-like roots [1-2].

5.2.107 Beta vulgaris craca

Beetroot

4 tin 8 cyuc 4 kcaok 0 tcan 2 dwat 0.9 m hkuc htut cyutli tcup hwicli hrasjltunyik hpa7tli flatprikldwissliph-som hpa7tmwatli xre7t hjonli

drutta Beta vulgaris craca is a BIENNIAL growing to 0.9 m (3ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline and saline soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Leaves RootEdible Uses: Root - raw or cooked[2, 16, 27, 132]. Well-grown roots are sweet and tender, especially when young, and can be grated and used in salads. Beetroots are traditionally boiled until tender then pickled in vinegar and used in salads. The roots can also be cooked and used as a vegetable, they are sweet and delicious when baked[K]. The root contains up to 8% sugar[143]. The root is tasteless when grown on very wet soils and dry when grown on clay soils[132]. Immature roots can be harvested in the summer and early autumn for immediate use, these are usually much more tender than the older roots[K]. Mature roots can be left in the ground all winter and harvested as required, though they might suffer damage in severe winters[K]. Alternatively, they are harvested in late autumn or early winter and will store for up to 6 months in a cool but not dry frost-free place[K]. Leaves - raw or cooked like spinach[183]. A reasonable spinach substitute, though harvesting leaves from growing plants can reduce yields of the roots[K]. Some people dislike the raw leaves since they can leave an unpleasant taste in the mouth[K]. A nutritional analysis is available[18].

dwatta Antitumor Carminative Emmenagogue Haemostatic Stomachic TonicAlthough little used in modern herbalism, beet has a long history of folk use, especially in the treatment of tumours[269]. The root of white-rooted forms contain betaine which promotes the regeneration of liver cells and the metabolism of fat cells[254]. The root of red-rooted forms contains betanin - an anthocyanin similar to those found in red wine - which is partly responsible for red beet's immune-enhancing effect[254]. The root is carminative, haemostatic, stomachic and a tonic for women[218].

The root can be used as part of the diet, or the juice can be extracted and used as a health-promoting drink[254]. At least one litre of the juice from red-rooted forms must be taken each day in order to stimulate the immune system[254]. The juice is prescribed by herbalists as part of a cancer-treatment regime[254]. A decoction prepared from the seed has been used as a remedy for tumours of the intestines. The seed, boiled in water, is said to cure genital tumours[269]. The juice or other parts of the plant is said to help in the treatment of tumours, leukaemia and other forms of cancer such as cancer of the breast, oesophagus, glands, head, intestines, leg, lip, lung, prostate, rectum, spleen, stomach, and uterus[269]. Some figure that betacyanin and anthocyanin are important in the exchange of substances of cancer cells; others note two main components of the amines, choline and its oxidation product betaine, whose absence produces tumours in mice[269]. The juice has been applied to ulcers[269]. A decoction is used as a purgative by those who suffer from haemorrhoids in South Africa[269]. Leaves and roots used as an emmenagogue[269]. Plant effective in the treatment of feline ascariasis[269]. In the old days, beet juice was recommended as a remedy for anaemia and yellow jaundice, and, put into the nostrils to purge the head, clear ringing ears, and alleviate toothache[269]. Beet juice in vinegar was said to rid the scalp of dandruff as scurf, and was recommended to prevent falling hair[269].

nrakta A cultivated form of *B. vulgaris maritima* that is grown for its edible root. ksacta Not known in a truly wild situation.

propta Seed - pre-soaking for 12 hours in warm water prior to sowing encourages mare rapid and even germination[264]. For the earliest crop, ready to harvest in late spring, sow the seed in situ in late February or early March, giving it some protection such as a cloche. The first outdoor sowings can be made in March in situ to provide a crop from early summer onwards. For both of these sowings it is important to choose varieties that are resistant to bolting in case there is a cold spell in the spring. Sowings for the main crop can be made in April to early June to provide roots for autumn, winter and early spring use. Late sowings of fast maturing varieties can be made in June and early July in order to provide fresh young roots in the autumn.

nwatta A very easily grown plant, it succeeds in sun or light shade in moist soils but prefers a rich well-drained light neutral to alkaline soil[33, 37]. Beets grow well in a variety of soils, growing best in a deep, friable well-drained soil abundant with organic matter, but doing poorly on clay. They prefer an open position and a light well-drained soil[52]. The optimum pH is 6.0 - 6.8, but neutral and alkaline soils are tolerated in some areas. Some salinity may be tolerated after the seedling stage. Beets are notable for their tolerance to manganese toxicity[269]. Beet is reported to tolerate an annual precipitation of 23 to 315cm, an average annual temperature range of 5.0 to 26.6°C and a pH of 4.2 to 8.2[269]. Plants are tolerant of saline soils and respond positively if salt is added to non-saline soils at a rate of about 30g per square metre[264]. Beetroot plants are generally hardy in Britain and can be left outdoors in the soil in most winters, though prolonged cold weather or severe winters can damage the roots. If the plants are exposed to prolonged temperatures below -10°c they will quickly run to seed[200]. This also applies to the young plants of most beetroot varieties if they are sown in early spring - a short period where temperatures fall below zero can fool the plant into believing that there has been a winter and it will then try to flower and produce seed. There are, however, come varieties, such as 'Bolthardy', that are more resistant to bolting and so more suited to these early sowings[200, 264]. The beetroot is widely cultivated, especially in temperate zones, for its edible root. There are two basic forms, those with rounded roots and those with elongated roots with many named varieties of each form. The roots can be available all year round from successional sowings. A fast-growing plant, some cultivars can produce a root ready for harvesting within 7 weeks from sowing the seed[264]. Most beetroot seed is actually a cluster of several seeds, though monogerm varieties have been produced that only have one seed - these monogerm varieties are less likely to require thinning once they have germinated[264]. A good companion for dwarf beans, onions and kohlrabi[18, 201]. Its growth is inhibited by runner beans, charlock and field mustard[18, 201].

kcakta Edible Parts: Fruit Inner bark LeavesEdible Uses: Fruit - raw[2, 7, 158]. Sweet but usually insipid[3, 11]. It contains about 1.5% protein, 0.4% fat, 7.8% carbohydrate, 0.7% malic acid[179]. A richer flavour develops if the fruit is dried, it can then be used as a raisin substitute. The fruit is up to 25mm long[200]. Some caution is advised, see the notes above on toxicity. Young leaves and shoots - cooked[105, 183]. A famine food, it is only used when all else fails[177]. A good vegetable, it is rich in carotene and calcium[179]. The leaf also contains 10% tannin[179]. Inner bark - roasted and ground into a meal then used as a thickener in soups etc or mixed with cereals when making bread. A famine food when all else fails[179]. The tree is said to be a source of an edible manna[183]. Young shoots can be used as a tea substitute[183].

tcanta Dye Fibre WoodA fibre is obtained from the bark of one-year old stems, it is used in weaving[7, 74]. A brown dye is obtained from the trunk[178]. The leaves contain 10% tannin[179]. Wood - hard, durable, fine and close-grained. Used for boat building, furniture etc[145, 149, 158].

dwatta Analgesic Antiasthmatic Antirheumatic Antitussive Astringent Diaphoretic Diuretic Emollient Expectorant Hypoglycaemic Hypotensive Odontalgic Sedative Urinary-The white mulberry has a long history of medicinal use in Chinese medicine, almost all parts of the plant are used in one way or another[238]. Recent research has shown improvements in elephantiasis when treated with leaf extract injections and in tetanus following oral doses of the sap mixed with sugar[238]. Analgesic, emollient, sedative[7, 176]. The leaves are antibacterial, astringent, diaphoretic, hypoglycaemic, odontalgic and ophthalmic[218, 238]. They are taken internally in the treatment of colds, influenza, eye infections and nosebleeds[238]. The leaves are collected after the first frosts of autumn and can be used fresh but are generally dried[238]. The stems are antirheumatic, diuretic, hypotensive and pectoral[218, 238]. A tincture of the bark is used to relieve toothache[7]. The branches are harvested in late spring or early summer and are dried for later use[238]. The fruit has a tonic effect on kidney energy[218, 238]. It is used in the treatment of urinary incontinence, tinnitus, premature greying of the hair and constipation in the elderly[238]. The root bark is antitussive, diuretic, expectorant and hypotensive[238]. It is used internally in the treatment of asthma, coughs, bronchitis, oedema, hypertension and diabetes[238]. The roots are harvested in the winter and dried for later use[238]. Extracts of the plant have antibacterial and fungicidal activity[218].

nrakta E. Asia - central and northern China. ksacta Not known in a truly wild situation.

propta The seed germinates best if given 2 - 3 months cold stratification[80, 98]. Sow the seed as soon as it is ripe if possible, otherwise in February in a cold frame. The seed usually germinates in the first spring, though it sometimes takes another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the cold frame for their first winter. Plant them out in late spring or early summer after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame. Plant out in spring. A good percentage take, though they sometimes fail to thrive[78, 113]. Cuttings of mature wood of the current season's growth, 25 - 30cm with a heel of 2 year old wood, autumn or early spring in a cold frame or a shady bed outside[78, 113, 200]. Bury the cuttings to threequarters of their depth. Layering in autumn[200].

nwatta Prefers a warm well-drained loamy soil in a sunny position[1, 11]. This variety of *M. alba* is said to have superior fruits[105]. According to many botanists it is no more than a clone of the species[200]. This is the form most commonly cultivated in India, where it is fast growing and adapted to field culture. It gives a high yield of large, tender, thick leaves[269]. Mulberries have brittle roots and so need to be handled with care when planting them out[238]. Any pruning should only be carried out in the winter when the plant is fully dormant because mulberries bleed badly when cut[238]. Ideally prune only badly placed branches and dead wood[238]. A good tree for growing grapes into[20]. The grapes are difficult to pick but always seem to be healthier and free from fungal diseases[201]. Plants in this genus are notably resistant to honey fungus[200].

5.2.55 Hemerocallis multiflora

4 tin 8 cyuc 4 kcaok 0 tcan 1 dwat m hkuc hmimhtut cyutli kyuctcup hwicli hrasjltunyikrip hpa7tli flat-prikliwis hpa7tmwatli xre7t hjonli

drutta Hemerocallis multiflora is a PERENNIAL growing to 1 m (3ft 3in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from July to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcasta Large quantities of the leaves are said to be hallucinogenic. Blanching the leaves removes this hallucinatory component[205]. (This report does not make clear what it means by blanching, it could be excluding light from the growing shoots or immersing in boiling water[K].)

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Leaves and young shoots - cooked[205]. They must be consumed when very young or else they become fibrous[K]. Flowers and flower buds - raw or cooked. Relatively small for a day lily, but the flowers are crisp with a pleasant sweetness and no aftertaste - they make a delicious addition to salads[K]. The flowers can also be dried and used as a thickener in soups etc. The flower buds contain about 43mg vitamin C per 100g, 983 IU vitamin A and 3.1% protein[205]. Root - raw or cooked[K]. We have found them to be tender but fairly bland with a slight sweetness[K]. The roots are slightly fleshy, with a swollen, tuberous part near the tip[266]. The swollen roots are quite small and are only really worthwhile using if the plant is being dug up for divisions or some other reason[K].

tcanta WeavingThe tough dried foliage is plaited into cord and used for making footwear[205].

dwatta Antidote Diuretic Vitamin CThe juice of the roots is an effective antidote in cases of arsenic poisoning[205]. A tea made from the boiled roots is used as a diuretic[205].

nrakta E. Asia - China in Hunan, Japan. ksacta Hill forests and openings in forests on hilltops at elevations of 700 - 1000 metresin China[266].

propta Seed - sow in the middle of spring in a greenhouse. Germination is usually fairly rapid and good. Prick out the seedlings into individual pots when they are large enough to handle. Grow the plants on for their first winter in a greenhouse and plant out in late spring[K]. Division in spring or after flowering in late summer or autumn[200]. Division is very quick and easy, succeeding at almost any time of the year[K]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Succeeds in most soils[1], including dry ones, preferring a rich moist soil and a sunny position[11] but tolerating partial shade[88]. Plants flower less freely in a shady position though the flowers can last longer in such a position[205]. Grows well in heavy clay soils. Succeeds in short grass if the soil is moist[1]. Prefers a pH between 6 and 7[200]. Hybridizes freely with other members of this genus[200]. This species is closely related to *H. micrantha* and *H. plicata*[205]. Individual flowers are short-lived but the plant produces a succession of blooms. Each scape carries between 75 and 100 blooms[205]. Plants take a year or two to become established after being moved[200]. Plants seem to be immune to the predations of rabbits[233]. The plants are very susceptible to slug and snail damage, the young growth in spring is especially at risk[200].

5.2.56 Prunus persica nucipersica

Nectarine

4 tin 8 cyuc 4 kcaok 2 tcan 3 dwat 6 m hkuc htut cyutli tcup hwicli hrasjltunyik hpa7tli flatprikliwis hpa7tmwatli fyfkrx7t hjonli

drutta Prunus persica nucipersica is a deciduous Tree growing to 6 m (19ft) by 6 m (19ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in April, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable

for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista The seed can contain high levels of hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is readily detected by its bitter taste. Usually present in too small a quantity to do any harm, any very bitter seed or fruit should not be eaten[65]. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: Flowers Fruit Oil Seed**Edible Uses:** Gum Oil TeaFruit - raw, cooked or dried for later use[1, 2, 34, 46]. The fruit is often used in ice creams, pies, jams etc[183]. When fully ripe, the fruits of the best forms are soft and juicy with a rich delicious flavour[K]. The size of fruit varies between cultivars but can be up to 7cm in diameter and contains one large seed[200]. Flowers - raw or cooked. Added to salads or used as a garnish[183]. They can also be brewed into a tea[183]. The distilled flowers yield a white liquid which can be used to impart a flavour resembling the seed[183]. Seed - raw or cooked. Do not eat if it is too bitter, seed can contain high concentrations of hydrocyanic acid. See the notes above on toxicity. A semi-drying oil is obtained from the seed[57]. Although the report does not mention edibility it can be assumed that it is edible. A gum is obtained from the stem. It can be used for chewing[64].

tcanta Adhesive Cleanser Dye Gum Oil A green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168]. A semi-drying oil is obtained from the seed[57]. It is used as a substitute for almond oil in skin creams[238]. The bruised leaves, when rubbed within any container, will remove strong odours such as garlic or cloves so long as any grease has first been fully cleaned off[4]. A gum obtained from the stem is used as an adhesive[64]. **Espalier.**

dwatta **Alterative Antiasthmatic Antitussive Astringent Demulcent Diuretic Emollient Expectorant Febrifuge Haemolytic Laxative SedativeAntihistosis**[194]. The leaves are astringent, demulcent, diuretic, expectorant, febrifuge, laxative, parasiticide and mildly sedative[21, 218]. They are used internally in the treatment of gastritis, whooping cough, coughs and bronchitis[238]. They also help to relieve vomiting and morning sickness during pregnancy, though the dose must be carefully monitored because of their diuretic action[21]. The dried and powdered leaves have sometimes been used to help heal sores and wounds[21]. The leaves are harvested in June and July then dried for later use[4]. The flowers are diuretic, sedative and vermifuge[4, 21, 176, 194, 218]. They are used internally in the treatment of constipation and oedema[238]. A gum from the stems is alterative, astringent, demulcent and sedative[4, 21, 176, 194, 218]. The seed is antiasthmatic, antitussive, emollient, haemolytic, laxative and sedative[4, 21, 176, 194, 218]. It is used internally in the treatment of constipation in the elderly, coughs, asthma and menstrual disorders[238]. The bark is demulcent, diuretic, expectorant and sedative[4]. It is used internally in the treatment of gastritis, whooping cough, coughs and bronchitis[238]. The root bark is used in the treatment of drowsy and jaundice[218]. The bark is harvested from young trees in the spring and is dried for later use[4]. The seed contains 'laetrole', a substance that has also been called vitamin B17[218]. This has been claimed to have a positive effect in the treatment of cancer, but there does not at present seem to be much evidence to support this[K]. The pure substance is almost harmless, but on hydrolysis it yields hydrocyanic acid, a very rapidly acting poison - it should thus be treated with caution[218]. In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta E. Asia - China. **ksacta** Not known in a truly wild situation, it is possibly derived in cultivation from *P. davidiana*.

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. The stored seed is best given 2 months warm followed by 3 months cold stratification[113]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings

into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200]. A very low percentage[113]. Softwood cuttings from strongly growing plants in spring to early summer in a frame[200]. Layering in spring.

nwatta Requires a well-drained moisture retentive soil[1, 11]. Thrives in a loamy soil, doing well on limestone[11]. Best not grown in acid soils. Prefers some chalk in the soil but it is apt to become chlorotic if too much is present[1]. Prefers a pH in the range 6 to 7[200]. Succeeds in light shade but fruits better in a sunny position[11]. Requires shelter from north and north-east winds[11] and also from spring frosts[200]. Widely cultivated for its edible fruit in warm temperate areas and continental climates, this is a form of the peach with a smooth skin. There are some named varieties[183]. There are numerous divisions of the varieties according to skin colour etc. Perhaps the most useful from the eaters point of view is whether it is free-stone (the flesh parts easily from the seed) or cling-stone (the flesh adheres to the seed)[200, K]. Trees are normally hardy in southern Britain[11], tolerating temperatures down to about -20°C[184], but they require some protection if cropping is to be at all reliable[11]. This is not due so much to lack of cold hardiness, more to the cooler summers in Britain which do not fully ripen the wood and the fruit, plus the unpredictable winters and springs which, in a mild spell, can excite the tree into premature flowering and growth which is then very liable to damage in any following cold spell. Hand pollination at this time can improve fruit-set[200]. In general it is best to site nectarines in a very warm sheltered sunny position, preferably against a south or west facing wall[200, 219], though some success is occasionally seen with plants grown fully in the open[K]. Most cultivars are self-fertile[200]. Trees are often grafted onto plum or other rootstocks but are said to be better when grown on their own roots in southern Britain[11]. Trees are not generally long-lived[200], this is partly because of the need for the tree to produce a constant supply of new wood since most fruit is formed on one-year old wood (though some fruit spurs are formed)[200]. Garlic is a good companion for this plant, helping to prevent disease, especially peach leaf curl[20, 201]. Tansy grown below peach trees helps to keep them healthier[201]. Peach leaf curl can also be prevented by protecting the plants from winter and early spring rains, perhaps by covering them in plastic[200]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. Plants in this genus are notably susceptible to honey fungus[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. **Espalier:** tree or other plant that is trained to grow flat against a support (such as a trellis or wall).

5.2.57 Hemerocallis minor

Grassleaf Day Lily, Small daylily

4 tlin 8 cyuc 4 kcaak 2 tcan 1 dwat m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnykfrip hpa7tli flat-priklwis hpa7tmwatli xre7t hjonli

drutta **Hemerocallis minor** is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Large quantities of the leaves are said to be hallucinogenic. Blanching the leaves removes this hallucinatory component[205]. (This report does not make clear what it means by blanching, it could be excluding light from the growing shoots or immersing in boiling water[K].)

kcakta Edible Parts: Leaves Leaves Root**Edible Uses:** Leaves and young shoots - cooked[2, 20, 46, 61, 183]. They must be consumed when very young or else they become fi-

in a sunny position though these flowers can be shorter-lived in very sunny positions[205]. Succeeds in short grass if the soil is moist[1]. Prefers a pH between 6 and 7[200]. Plants are hardy to at least -20°C[187]. Widely cultivated in China for its edible flowers, especially in Hunan province[266]. Hybridizes freely with other members of this genus[200]. This species is said to be self-incompatible[127, 205]. Many of the plants in cultivation under this name are *H. thunbergii*[205]. The sub-species *H. citrina vespertina* (Hara.)Erhardt. is a very free-flowering form, producing up to 75 buds per scape and capable of flowering from July to October if the weather is suitable[205]. The plant forms a loose spreading clump[K]. The roots form pseudobulbs[205]. Plants take a year or two to become established after being moved[1]. Plants seem to be immune to the predations of rabbits[233]. The plants are very susceptible to slug and snail damage, the young growth in spring is especially at risk[200]. Individual flowers are very short-lived, they open in the late afternoon and die in the morning[200]. However, plants produce a succession of flowers for several weeks of the summer. The number of flowers on a scape varies from 7 to 65[205]. The flowers have a lemony scent[205]. Another report says that they have a pronounced honeysuckle scent[245].

5.2.105 Hemerocallis dumortieri

Dumortier's daylily

4 tlin 8 cyuc 4 kcaak 3 tcan 1 dwat 0.5 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnykfrip hpa7tli flat-priklwis hpa7tmwatli xre7t hjonli

drutta **Hemerocallis dumortieri** is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from May to June. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Large quantities of the leaves are said to be hallucinogenic. Blanching the leaves removes this hallucinatory component[205]. (This report does not make clear what it means by blanching, it could be excluding light from the growing shoots or immersing in boiling water[K].)

kcakta Edible Parts: Leaves Leaves Shoots**Edible Uses:** Leaves and young shoots - cooked[105, 177, 183]. They must be consumed when very young or else they become fibrous[K]. Flowers and flower buds - raw or cooked[105, 177, 205]. The flowers are crisp and juicy with a pleasant sweetness and no unpleasant after-taste[K]. They can be dried and used as a thickener in soups etc[183]. The flower buds contain about 43mg vitamin C per 100g, 983 IU vitamin A and 3.1% protein[205]. Root - raw or cooked.

tcanta WeavingThe tough dried foliage is plaited into cord and used for making footwear[205]. Plants form a slowly spreading clump and are suitable for ground cover when spaced about 45cm apart each way[208]. The dead leaves should be left on the ground in the winter to ensure effective cover[208].

dwatta **Antidote Diuretic Vitamin C**The juice of the roots is an effective antidote in cases of arsenic poisoning[205]. A tea made from the boiled roots is used as a diuretic[205].

nrakta E. Asia - Japan, Korea. **ksacta** Meadows in the mountains of N. and C. Japan[58, 187].

propta Seed - sow in the middle of spring in a greenhouse. Germination is usually fairly rapid and good. Prick out the seedlings into individual pots when they are large enough to handle. Grow the plants on for their first winter in a greenhouse and plant out in late spring[K]. Division in spring or after flowering in late summer or autumn[200]. Division is very quick and easy, succeeding at almost any time of the year[K]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Succeeds in most soils[1], including dry ones, preferring a rich moist soil[200]. Grows well in heavy clay soils. Succeeding in sun or shade, it produces more flowers in a sunny position though these flowers can be shorter-lived in very sunny positions[205]. Succeeds in short grass if the soil is moist[1]. Prefers a pH between 6 and 7[200]. This

species is hardy to about -20°C[187]. Hybridizes freely with other members of this genus[200]. Individual flowers only live for one day[205]. The flowers are sweetly scented[245]. Plants form a tight clump that spreads slowly[K]. The roots are cylindrical[205]. Plants take a year or two to become established after being moved[200]. Plants seem to be immune to the predations of rabbits[233]. The plants are very susceptible to slug and snail damage, the young growth in spring is especially at risk[200].

5.2.106 Hemerocallis lilioasphodelus

Yellow Day Lily

4 tlin 8 cyuc 4 kcaak 2 tcan 2 dwat 0.6 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnykfrip hpa7tli flat-priklwis hpa7tmwatli fyfkrx7t hjonli

drutta **Hemerocallis lilioasphodelus** is a PERENNIAL growing to 0.6 m (2ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from May to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Large quantities of the leaves are said to be hallucinogenic. Blanching the leaves removes this hallucinatory component[205]. (This report does not make clear what it means by blanching, it could be excluding light from the growing shoots or immersing in boiling water[K].)

kcakta Edible Parts: Leaves Leaves Root Shoots**Edible Uses:** Leaves and young shoots - raw or cooked like asparagus or celery[85, 105, 183]. They must be consumed when very young or else they become fibrous[K]. Flower buds - raw or cooked. They taste somewhat like green beans[85, 105]. They contain about 43mg vitamin C per 100g, 983 IU vitamin A and 3.1% protein[205]. Flowers - raw or cooked[85, K]. They can be dried and used as a thickener in soups etc[183]. If the flowers are picked just as they start to wither they can be used as a condiment[85]. The flowers are a traditional food in China where they are steamed and then dried[266]. Root - cooked[85, 105]. They taste like a blend of sweet corn and salsify[183]. We have found them to be tender but fairly bland with a slight sweetness[K]. The swollen roots are quite small and are only really worthwhile using if the plant is being dug up for divisions or some other reason[K].

tcanta WeavingThe tough dried foliage is plaited into cord and used for making footwear[205]. Plants form a spreading clump and are suitable for ground cover when spaced about 45cm apart each way[208]. The dead leaves should be left on the ground in the winter to ensure effective cover[208].

dwatta **Antidote Cancer Diuretic Vitamin C**The juice of the roots is an effective antidote in cases of arsenic poisoning[205]. The root also has a folk history of use in the treatment of cancer - extracts from the roots have shown antitumour activity[218]. A tea made from the boiled roots is used as a diuretic[205].

nrakta Original habitat is obscure, possibly China. An occasional garden escape in Britain. **ksacta** Rocky mountain woods, wet meadows and riversides on foothills of the S.E. Alps in Europe[50].

propta Seed - sow in the middle of spring in a greenhouse. Germination is usually fairly rapid and good. Prick out the seedlings into individual pots when they are large enough to handle. Grow the plants on for their first winter in a greenhouse and plant out in late spring[K]. Division in spring or after flowering in late summer or autumn[200]. Division is very quick and easy, succeeding at almost any time of the year[K]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Succeeds in most soils[1], including dry ones, preferring a rich moist soil and a sunny position[11] but tolerating partial shade[88, 111]. Plants flower less freely in a shady position though the flowers can last longer in such a position[205]. Grows well in heavy clay soils. Succeeds in

(has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate strong winds but not maritime exposure.

kcakta Edible Parts: Flowers Leaves Stem**Edible Uses:** Condiment Tea**Leaves** - raw or cooked as a potherb[5, 52, 183]. **Oregano** is an important flavouring herb in Mediterranean cookery, and is often used dried rather than fresh[238]. The leaves are used as a flavouring for salad dressings, vegetables and legumes, and are frequently included in strongly flavoured dishes with chillies, garlic, onions etc[2, 13, 21, 27, 183, 238]. A nutritional analysis is available[218]. Flowers, usually appear in late spring, are edible. Much of the commercially available dried oregano does not come from this plant but from a number of different, often unrelated plants[238]. These include *Lippia graveolens*, *L. palmeri* and *Origanum syriacum*[238]. A herb tea is made from the dried leaves and flowering stems[183, 207, 238].

tcanta Dye Essential Parasiticide Repellent StrewingAn essential oil from the plant is used as a food flavouring, in soaps and perfumery[115, 171]. The herb contains 0.15 - 0.4% essential oil[218] and makes good herbal pillows and baths[244]. The plant was formerly used as a strewing herb[201]. The essential oil has also been used to kill lice, though some caution is advised since it can cause skin irritations[238]. A red or purple dye is obtained from the flowering tops[4, 7, 13, 100], it is neither brilliant nor durable[115]. The plant repels ants[46]. The growing plant repels many insect pests so it is a good plant to grow in the vegetable area[201]. A useful ground cover for sunny positions, forming a slowly spreading clump[197, K]. Plants should be spaced about 30cm apart each way[208].

dwatta Antirheumatic Antiseptic Antispasmodic Aromatherapy Carminative Cholagogue Diaphoretic Emmenagogue Expectorant Odontalgic Parasiticide Stimulant Stomachic TonicOregano has been used as a culinary and medicinal herb for thousands of years. It has a beneficial effect upon the digestive and respiratory systems and is also used to promote menstruation[254]. It should not be used medicinally by pregnant women though it is perfectly safe in small amounts for culinary purposes[254]. The leaves and flowering stems are strongly antiseptic, antispasmodic, carminative, cholagogue, diaphoretic, emmenagogue, expectorant, stimulant, stomachic and mildly tonic[4, 7, 9, 21, 254]. The plant is taken internally in the treatment of colds, influenza, mild feverish illnesses, indigestion, stomach upsets and painful menstruation[238]. It is strongly sedative and should not be taken in large doses, though mild teas have a soothing effect and aid restful sleep[244]. It should not be prescribed for pregnant women[238]. Externally, oregano is used to treat bronchitis, asthma, arthritis and muscular pain[238]. The plant can be used fresh or dried - harvest the whole plant (but not the roots) in late summer to dry and store for winter use[244]. Oregano is often used in the form of an essential oil that is distilled from the flowering plant[4]. A few drops of the essential oil, put on cotton wool and placed in the hollow of an aching tooth, frequently relieves the pain of toothache[4, 207]. This plant is one of the best natural antiseptics because of its high thymol content[7]. The essential oil is used in aromatherapy to treat the same kinds of complaints that the herb is used for[238].

nrakta Most of Europe, including Britain, to north and west Asia. **ksacta** Dry grassy areas and scrub, usually on calcareous soils[9, 17].

propta Seed - sow early spring at 10 - 13°C and only just cover the seed. Germination usually takes place within 2 weeks. Prick out the seedlings into individual pots when they are large enough to handle and plant them out into their permanent positions in early summer. The seed can also be sown in situ in late spring. Division in March or October. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer. Basal cuttings of young barren shoots in June. Very easy. Harvest the shoots with plenty of underground stem when they are about 8 -

10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Landscape **Uses:**Border, Container, Ground cover, Rock garden, Seashore. Requires a rather dry, warm, well-drained soil in full sun, but is not fussy as to soil type, thriving on chalk[1, 27]. Prefers slightly alkaline conditions[200]. Tolerates poor soils[24]. Dislikes wet soils[37]. Hardy to about -20°C[187]. **Oregano** has a long history of culinary and medicinal use and is often cultivated in modern gardens as a culinary herb, there are some named varieties[183, 187, 238, 244]. Plants growing near the sea have the most fragrance[7]. A good companion plant, improving the flavour of nearby plants[201]. The flowers are very attractive to bees and butterflies[5, 30]. A good companion for the cucumber family[14], it is beneficial to all nearby plants[20]. The whole plant has a sweet yet slightly peppery aroma[245]. Members of this genus are rarely if ever troubled by browsing deer[233]. **Special Features:** Attractive foliage, Fragrant foliage, Not North American native, Attracts butterflies, Suitable for cut flowers, Suitable for dried flowers, Fragrant flowers. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [2-1].

5.2.104 Hemerocallis citrina

Citron daylily

4 tlin 8 cyuc 4 kcaak 2 tcan 1 dwat 0.8 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnykfrp hpa7tli flat-prikliwis hpa7tmwatli dyatkre7t hjonli

drutta *Hemerocallis citrina* is a PERENNIAL growing to 0.8 m (2ft 7in) by 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Large quantities of the leaves are said to be hallucinogenic. Blanching the leaves removes this hallucinatory component[205]. (This report does not make clear what it means by blanching, it could be excluding light from the growing shoots or immersing in boiling water[K].)

kcakta Edible Parts: Flowers Leaves Root**Edible Uses:** Leaves and young shoots - cooked[205]. They must be consumed when very young or else they become fibrous[K]. Flowers and flower buds - raw or cooked[105, 177]. The flowers can be dried and used as a thickener in soups etc. The slender trumpets vary from 12 - 17cm long[205]. There can be from 7 to 65 buds on a flowering stem[205]. The flower buds contain about 43mg vitamin C per 100g. 983 IU vitamin A and 3.1% protein[205]. Root - raw or cooked[205]. The flavour is somewhat radish-like but not so sharp[205].

tcanta WeavingThe tough dried foliage is plaited into cord and used for making footwear[205].

dwatta Antidote Diuretic Vitamin CThe juice of the roots is an effective antidote in cases of arsenic poisoning[205]. A tea made from the boiled roots is used as a diuretic[205].

nrakta E. Asia - China. **ksacta** Forest margins, grassy fields and slopes along valleys from near sea level to 2000 metres[266].

propta Seed - sow in the middle of spring in a greenhouse. Germination is usually fairly rapid and good. Prick out the seedlings into individual pots when they are large enough to handle. Grow the plants on for their first winter in a greenhouse and plant out in late spring[K]. Division in spring or after flowering in late summer or autumn[200]. Division is very quick and easy, succeeding at almost any time of the year[K]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Succeeds in most soils[1], including dry ones, preferring a rich moist soil[200]. Grows well in heavy clay soils. Succeeding in sun or shade, it produces more flowers

brous[K]. One report says that eating these leaves appears to stimulate or intoxicate to some extent[2]. Flowers and flower buds - raw or cooked[2, 20, 46, 61]. Considered to be a great delicacy[177]. The flowers are a traditional food in China where they are steamed and then dried[266]. The flowers can be dried and used as a relish or a thickener in soups etc[178, 183]. The flower buds contain about 43mg vitamin C per 100g, 983 IU vitamin A and 3.1% protein[205]. Root - raw or cooked[183, 205]. A radish-like flavour but not so sharp[205].

tcanta WeavingThe tough dried foliage is plaited into cord and used for making footwear[205].

dwatta Anodyne Antidote Cancer Diuretic Febrifuge Vitamin CAnodyne, antidote, diuretic, febrifuge[178]. The juice of the roots is an effective antidote in cases of arsenic poisoning[205]. The root also has a folk history of use in the treatment of cancer - extracts from the roots have shown antitumour activity[218]. A tea made from the boiled roots is used as a diuretic[205].

nrakta E. Asia - N. China, Korea. **ksacta** Water meadows, elevated wet places with sandy soils, forest glades, mountain slopes and scrub[74].

propta Seed - sow in the middle of spring in a greenhouse. Germination is usually fairly rapid and good. Prick out the seedlings into individual pots when they are large enough to handle. Grow the plants on for their first winter in a greenhouse and plant out in late spring[K]. Division in spring or after flowering in late summer or autumn[200]. Division is very quick and easy, succeeding at almost any time of the year[K]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Succeeds in most soils[1], including dry ones, preferring a rich moist soil and a sunny position[111] but tolerating partial shade[88]. Plants flower less freely in a shady position though the flowers can last longer in such a position[205]. Grows well in heavy clay soils. Succeeds in short grass if the soil is moist[1]. Prefers a pH between 6 and 7[200]. A very cold-hardy plant, tolerating temperatures down to about -25°C[187]. Hybridizes freely with other members of this genus[200]. A very ornamental plant, its roots are slender and not tuberous, whilst the rhizomes are not spreading[187]. The roots sometimes have bulbous swellings at their tips[205]. The flowers open in the evening and live for about 2 days[205]. The flowers have a powerful scent of honeysuckle[245]. Plants take a year or two to become established before being moved[200]. Plants seem to be immune to the predations of rabbits[233]. The plants are very susceptible to slug and snail damage, the young growth in spring is especially at risk[200].

5.2.58 Crataegus mollis

Red Haw, Downy hawthorn

4 tlin 8 cyuc 4 kcaak 2 tcan 2 dwat m hkuc hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnykfrp hpa7tli flatprikliwisslip hpa7tmwatli kre7t hjonli

drutta *Crataegus mollis* is a deciduous Tree growing to 9 m (29ft) by 12 m (39ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to June, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: Fruit**Edible Uses:** TeaFruit - raw or cooked[22, 46, 62, 101, 183]. Sub-acid, dry and mealy[82, 227]. The fruit is also used for making jellies and preserves[61, 95, 183]. Fairly large, it is about 20 - 25mm in diameter[200], with a thick flesh[229]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K]. A tea-like beverage can be made from the twigs[257].

tcanta Hedge HedgeThe plant is tolerant of being trimmed and will even resprout if cut back into very old wood. It can be used as a hedge[50]. Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta Eastern and Central N. America - Ontario to Alabama, west to Oklahoma. **ksacta** Open woods, usually in alluvial or fertile soils[43]. Frequently found in limestone soils[229].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta Landscape **Uses:**Espalier, Pollard, Specimen, Street tree. A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. A very hardy plant, tolerating temperatures down to at least -18°C[202]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. A very ornamental plant[11], the branches are almost thornless[229]. A rather variable species, it has been separated into several different species by some botanists[82]. This species is much confused with *C. chrysocarpa*[11] and with *C. coccinea*[50]. It is very closely related to *C. submollis*, differing in having 20 stamens to a flower (as compared to 10 in *C. submollis*)[202]. **Special Features:** North American native, Attractive flowers or blooms. The plant is heat tolerant in zones 6 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information

on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

5.2.59 Actinidia polygama

Silver Vine

4 tlin 8 cyuc 4 kcaak 0 tcan 2 dwat 6 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnykrip hpa7tli flatprikwiw hpa7tmwatli nyanhjen hjonli

drutta Actinidia polygama is a deciduous Climber growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from June to July, and the seeds ripen from October to November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees, insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: TeaFruit - raw or cooked[183]. Not very palatable, it is eaten salted[151, 177]. Some cultivars have nice flavoured fruits[183]. The fruit contains up to 5 times the vitamin C of blackcurrants[74]. Fairly large fruits, up to 3cm across[200]. The ovoid fruits are orange and hairless when fully ripe[266]. It contains a number of small seeds, but these are easily eaten with the fruit[K]. Leaves - raw or cooked[4, 61, 105, 177, 183]. The leaves can also be roasted and mixed with tea[183].

dwatta Hallucinogenic Sedative Vitamin CThe leaves are hallucinogenic and sedative[192]. The leaves contain substances that make them very attractive to cats and for this reason they are especially useful as a sedative for lions etc in zoos[192]. When consumed in large quantities the leaves can have a mild hallucinatory effect[192]. Polygamol, which is made from the fruits, is used as a heart tonic[218]. A dry decoction is used to treat colic and rheumatism[218].

nrakta E. Asia - China, Japan ksacta Woodlands and hedges in mountains throughout Japan[58]. Mountain forests at elevations of 500 - 1900 metres in China[266].

propta Seed - sow spring in a greenhouse[133]. It is probably best if the seed is given 3 months stratification[113], either sow it in a cold frame as soon as it is ripe in November or as soon as it is received. Fresh seed germinates in 2 - 3 months at 10°C, stored seed can take longer[133]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for at least their first winter. When the plants are 30cm or more tall, plant them out into their permanent positions in late spring or early summer, after the last expected frosts[K]. Most seedlings are male[126]. The seedlings are subject to damping off, they must be kept well ventilated[113]. Cuttings of softwood as soon as ready in spring in a frame[K]. Cuttings of half-ripe wood, July/August in a frame. Very high percentage[113]. Cuttings of ripe wood, October/November in a frame.

nwatta Prefers a sound loamy neutral soil[1, 200]. Succeeds in semi-shade but full sun is best for fruit production[200]. Prefers a sheltered position[200]. Plants are hardy to about -30°C. when dormant but young growth in spring can be cut back by late frosts[160]. Plants are formed on second year wood and also on fruit spurs on older wood[126], any pruning is best carried out in the winter[219]. The flowers are fragrant[245]. This is a climbing plant, supporting itself by twining around branches etc[200]. The plant is very attractive to cats and can be damaged by them[74, 151, 200]. This species has been confused in literature with *A. kolomikta*[198]. It is closely related but can be distinguished by the leaves which are tapered at the base whilst those of *A. kolomikta* are heart-shaped[219]. Plants in this genus are notably resistant to honey fungus[200]. One report suggests that plants are self-fertile whilst another says that they are dioecious. It is likely that most plants are dioecious but that there are some self-fertile hermaphrodite forms. A cultivar named 418-77 is self-fertile[183].

5.2.60 Cornus mas

Cornelian Cherry, Cornelian Cherry Dogwood

4 tlin 8 cyuc 4 kcaak 3 tcan 2 dwat m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnykrip hpa7tli flatprik-wisslip hpa7tmwatli xre7t hjonli

drutta Cornus mas is a deciduous Shrub growing to 5 m (16ft) by 5 m (16ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from February to March, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

kcakta Edible Parts: Fruit OilEdible Uses: Coffee Oil OilFruit - raw, dried or used in preserves[2, 3, 7, 9, 13, 183]. Juicy, with a nice acid flavour[11]. The fully ripe fruit has a somewhat plum-like flavour and texture and is very nice eating, but the unripe fruit is rather astringent[K]. It is rather low in pectin and so needs to be used with other fruit when making jam[9]. At one time the fruit was kept in brine and used like olives[183]. The fruit is a reasonable size, up to 15mm long, with a single large seed[K]. A small amount of edible oil can be extracted from the seeds[7]. Seeds are roasted, ground into a powder and used as a coffee substitute[183].

tcanta Dye Hedge Hedge Oil Oil Tannin WoodAn oil is obtained from the seed[7]. A dye is obtained from the bark[3, 7]. No more details are given. Another report says that a red dye is obtained from the plant, but does not say which part of the plant[4]. The leaves are a good source of tannin[7]. Wood - very hard, it is highly valued by turners[7]. The wood is heavier than water and does not float[7]. It is used for tools, machine parts, etc[7, 11, 13, 61].

dwatta Astringent Cholera Febrifuge NutritiveThe bark and the fruit are astringent, febrifuge and nutritive[7]. The astringent fruit is a good treatment for bowel complaints and fevers, whilst it is also used in the treatment of cholera[4, 254]. The flowers are used in the treatment of diarrhoea[4].

nrakta Europe. Naturalized in Britain[17]. ksacta Woodlands, especially in calcareous soils[7, 13].

propta Seed - best sown as soon as it is ripe in a cold frame or in an outdoors seedbed if there is sufficient seed[80, 113]. The seed must be separated from the fruit flesh since this contains germination inhibitors[80, 164]. Stored seed should be cold stratified for 3 - 4 months and sown as early as possible in the year[164]. Scarification may also help as may a period of warm stratification before the cold stratification[80, 164]. Germination, especially of stored seed, can be very slow, taking 18 months or more[164]. Prick out the seedlings of cold-frame sown seeds into individual pots as soon as they are large enough to handle and grow the plants on for their first winter in a greenhouse, planting out in the spring after the last expected frosts. Cuttings of half-ripe side shoots, July/August in a frame[188]. Cuttings of mature wood of the current year's growth, taken with a heel if possible, autumn in a cold frame. High percentage[78]. Layering of new growth in June/July. Takes 9 months[78].

nwatta Landscape Uses:Border, Firewood, Pest tolerant, Hedge, Screen, Specimen, Woodland garden. An easily grown plant, it succeeds in any soil of good or moderate fertility[1], ranging from acid to shallow chalk[200]. Grows well in heavy clay soils. Prefers a moist soil[108] and a sunny position[15] but also succeeds in light shade[188]. Plants are fairly wind resistant[K]. Plants grow and crop well in pots. A very hardy plant, tolerating temperatures down to about -25°C[184]. At one time the cornelian cherry was frequently cultivated for its edible fruit, though it has fallen into virtual disuse as a fruit crop in most areas[3]. It is still being cultivated in parts of C. Europe and there are some named varieties[183]. 'Macrocarpa' has larger fruits than the type[182]. 'Nana' is a dwarf form, derived from a yellow-fruited clone[182]. 'Variegata' has been seen on a number of occasions with very large crops of fruit, even in years when the type species has not fruited well[K]. 'Jolico' has well-flavoured fruits 3 times larger than the species. There are also a number of cultivars with yellow, white and purplish fruit. Seedlings can take up to 20 years to come into fruit.

5.2.101 Beta vulgaris cicla

Spinach Beet

4 tlin 8 cyuc 4 kcaak 0 tcan 2 dwat 0.9 m hkuc
htut cyutli tcup hwicli hrasjlutnykrip hpa7tli flatprikwlissliph-som hpa7tmwatli xre7t hjonli

drutta Beta vulgaris cicla is a BIENNIAL growing to 0.9 m (3ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline and saline soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Leaves StemEdible Uses: Leaves and leaf stems - raw or cooked like spinach[2, 16, 27, 33]. A very good spinach substitute, the leaves are large and easily harvested, yields are high[K]. Some people dislike the raw leaves since they can leave an unpleasant taste in the mouth[K]. Flowering stem - cooked. A broccoli substitute[K].

dwatta Although little used in modern herbalism, beet has a long history of folk use, especially in the treatment of tumours[269]. A decoction prepared from the seed has been used as a remedy for tumours of the intestines. The seed, boiled in water, is said to cure genital tumours[269]. The juice or other parts of the plant is said to help in the treatment of tumours, leukaemia and other forms of cancer such as cancer of the breast, oesophagus, glands, head, intestines, leg, lip, lung, prostate, rectum, spleen, stomach, and uterus[269]. Some figure that betacyanin and anthocyanin are important in the exchange of substances of cancer cells; others note two main components of the amines, choline and its oxidation product betaine, whose absence produces tumours in mice[269]. The juice has been applied to ulcers[269]. A decoction is used as a purgative by those who suffer from haemorrhoids in South Africa[269]. Leaves and roots used as an emmenagogue[269]. Plant effective in the treatment of feline ascariasis[269]. In the old days, beet juice was recommended as a remedy for anaemia and yellow jaundice, and, put into the nostrils to purge the head, clear ringing ears, and alleviate toothache[269]. Beet juice in vinegar was said to rid the scalp of dandruff as scurf, and was recommended to prevent falling hair[269]. Juice of the white beet was said to clear obstructions of the liver and spleen[269]. Culpepper (1653) recommended it for treating headache and vertigo as well as all affections of the brain[269].

nrakta A cultivated form of *B. vulgaris maritima* that is grown for its edible leaves. ksacta Not known in a truly wild situation.

propta Seed - sow in situ in early April for the summer crop and again in early July to August for the winter and spring crop. It is also possible to obtain an earlier crop by sowing the seed in a tray in a greenhouse in March and planting out in April/May[264].

nwatta A very easily grown plant, it succeeds in sun or light shade in moist soils but prefers a rich well-drained light neutral to alkaline soil[33, 37]. Beets grow well in a variety of soils, growing best in a deep, friable well-drained soil abundant with organic matter, but doing poorly on clay. They prefer an open position and a light well-drained soil[52]. The optimum pH is 6.0 - 6.8, but neutral and alkaline soils are tolerated in some areas. Some salinity may be tolerated after the seedling stage. Beets are notable for their tolerance to manganese toxicity[269]. Beet is reported to tolerate an annual precipitation of 23 to 315cm, an average annual temperature range of 5.0 to 26.6°C and a pH of 4.2 to 8.2[269]. Plants are tolerant of saline soils and respond positively if salt is added to non-saline soils at a rate of about 30g per square metre[264]. Spinach beet is often cultivated by gardeners for its edible leaves[16], it does not make a very good commercial crop since the leaves quickly droop after being harvested and so do not stand the journey to market. This plant is a good hot weather substitute for spinach[183]. The leaves are available all year round from successional sowings if the winters are not too severe[K]. In severe winters it is possible to dig up some plants and move them to a protected area such as a greenhouse in order to produce fresh leaves[1]. Plants usually self-sow freely if they are well-sited and the ground is disturbed by hoeing etc[K]. A good companion for dwarf beans, onions and kohlrabi[18], though the

growth of spinach beet is inhibited by runner beans, charlock and field mustard[18].

5.2.102 Hemerocallis littorea

Coastal Day Lily

4 tlin 8 cyuc 4 kcaak 2 tcan 1 dwat 0.9 m hkuc
hmimhtut cyutli kyuctcup hwicli hrasjlutnykrip hpa7tli flatprikwiw hpa7tmwatli xre7t hjonli

drutta Hemerocallis littorea is a PERENNIAL growing to 0.9 m (3ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from August to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Large quantities of the leaves are said to be hallucinogenic[127, 137]. Blanching the leaves removes this hallucinatory component[205]. (This report does not make clear what it means by blanching, it could be excluding light from the growing shoots or immersing in boiling water[K].)

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Leaves and young shoots - cooked. They must be consumed when very young or else they become fibrous[K]. Flowers and flower buds - raw or cooked[105, 177]. They can be dried and used as a thickener in soups etc. The flower buds contain about 43mg vitamin C per 100g, 983 IU vitamin A and 3.1% protein[205]. Root - raw or cooked. A pleasant nutty flavour. This sub-species has a fibrous root system[205].

tcanta WeavingThe tough dried foliage is plaited into cord and used for making footwear[205]. Attractive flowers.

dwatta Antidiote Diuretic Vitamin CThe juice of the roots is an effective antidote in cases of arsenic poisoning[205]. A tea made from the boiled roots is used as a diuretic[205].

nrakta E. Asia - Japan. ksacta Grassy places near the sea[58, 187].

propta Seed - sow in the middle of spring in a greenhouse. Germination is usually fairly rapid and good. Prick out the seedlings into individual pots when they are large enough to handle. Grow the plants on for their first winter in a greenhouse and plant out in late spring[K]. Division in spring or after flowering in late summer or autumn[200]. Division is very quick and easy, succeeding at almost any time of the year[K]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Succeeds in most soils[1], including dry ones, preferring a rich moist soil and a sunny position[200] but tolerating partial shade[88]. Plants flower less freely in a shady position though the flowers can last longer in such a position[205]. Grows well in heavy clay soils. Succeeds in short grass if the soil is moist[1]. Prefers a pH between 6 and 7[200]. Plants are hardy to about -15°C[187]. The plant has a fibrous root system[205]. Individual flowers are short-lived, opening in the morning and withering in the evening. The plant, however, produces a succession of flowers over a period of about 6 weeks[205]. Hybridizes freely with other members of this genus[200]. Unlike the type species, this form does produce viable seed[187]. Plants take a year or two to become established after being moved[200]. They can then spread quite freely[K]. Plants seem to be immune to the predations of rabbits[233]. The plants are very susceptible to slug and snail damage, the young growth in spring is especially at risk[200].

5.2.103 Origanum vulgare

Oregano, Pot Marjoram

4 tlin 10 cyuc 4 kcaak 5 tcan 3 dwat 0.6 m hkuc
hmimhtut cyutli kyuctcup hwicli hysihrasjlutnykrip hpa7tli flatprikwiw hpa7tmwatli xre7t hjonli

drutta Origanum vulgare is a PERENNIAL growing to 0.6 m (2ft) by 0.8 m (2ft 7in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite

5.2.99 Beta vulgaris flavescens

Swiss Chard

4 tin 8 cyuc 4 kcaak 2 tcan 2 dwat 0.9 m hkuc htut cyuti tcup hwicli hrasjlutnyik hpa7tli flatprikliwssiph-som hpa7tmwatli xre7t hjonli

drutta *Beta vulgaris flavescens* is a BIENNIAL growing to 0.9 m (3ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline and saline soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Leaves StemEdible Uses: Leaves - raw or cooked like spinach[2, 16, 27, 33]. A very good spinach substitute, the leaves are large and easily harvested, yields are high[K]. Some people dislike the raw leaves since they can leave an unpleasant taste in the mouth[K]. Leaf stems - cooked. The steamed stems retain their crispness and have a delicious flavour, they are considered to be a gourmet vegetable[K]. Flowering stem - cooked. A broccoli substitute[16].

tcanta CompanionAgroforestry Uses: Beet is said to be a good companion for dwarf beans, onions and kohlrabi[18], though the growth of spinach beet is inhibited by runner beans, charlock and field mustard[18].

dwatta Antitumor EmmenagogueAlthough little used in modern herbalism, beet has a long history of folk use, especially in the treatment of tumours[269]. A decoction prepared from the seed has been used as a remedy for tumours of the intestines. The seed, boiled in water, is said to cure genital tumours[269]. The juice or other parts of the plant is said to help in the treatment of tumours, leukaemia and other forms of cancer such as cancer of the breast, oesophagus, glands, head, intestines, leg, lip, lung, prostate, rectum, spleen, stomach, and uterus[269]. Some figure that betacyanin and anthocyanin are important in the exchange of substances of cancer cells; others note two main components of the amines, choline and its oxidation product betaine, whose absence produces tumours in mice[269]. The juice has been applied to ulcers[269]. A decoction is used as a purgative by those who suffer from haemorrhoids in South Africa[269]. Leaves and roots used as an emmenagogue[269]. Plant effective in the treatment of feline ascariasis[269]. In the old days, beet juice was recommended as a remedy for anaemia and yellow jaundice, and, put into the nostrils to purge the head, clear ringing ears, and alleviate toothache[269]. Beet juice in vinegar was said to rid the scalp of dandruff as scurf, and was recommended to prevent falling hair[269]. Juice of the white beet was said to clear obstructions of the liver and spleen[269]. Culpepper (1653) recommended it for treating headache and vertigo as well as all affections of the brain[269].

nrakta A cultivated form of *B. vulgaris maritima* that is grown for its leaves and petioles. ksacta Not known in a truly wild situation.

propta Seed - sow in situ in early April for the summer crop and again in early July to August for the winter and spring crop. It is also possible to obtain an earlier crop by sowing the seed in a tray in a greenhouse in March and planting out in April/May[264].

nwatta A very easily grown plant, it succeeds in sun or light shade in moist soils but prefers a rich well-drained light neutral to alkaline soil[33, 37]. Beets grow well in a variety of soils, growing best in a deep, friable well-drained soil abundant with organic matter, but doing poorly on clay. They prefer an open position and a light well-drained soil[52]. The optimum pH is 6.0 - 6.8, but neutral and alkaline soils are tolerated in some areas. Some salinity may be tolerated after the seedling stage. Beets are notable for their tolerance to manganese toxicity[269]. Beet is reported to tolerate an annual precipitation of 23 to 315cm, an average annual temperature range of 5.0 to 26.6°C and a pH of 4.2 to 8.2[269]. Plants are tolerant of saline soils and respond positively if salt is added to non-saline soils at a rate of about 30g per square metre[264]. Plants frequently self-sow if they are happy, sometimes too freely[K]. Swiss chard is sometimes cultivated by gardeners for its edible leaves and stems[16], it does not make a very good commercial crop since the leaves quickly droop after being harvested and therefore do not make the

trip to market. The leaves are a good hot weather substitute for spinach[183] and can be available all year round if the winters are not too severe[K]. In severe winters it is possible to dig up some plants and move them to a protected area such as a greenhouse in order to produce fresh leaves[1]. A good companion for dwarf beans, onions and kohlrabi[18]. Its growth is inhibited by runner beans, charlock and field mustard[18].

5.2.100 Stachys affinis

Chinese Artichoke, Artichoke betony

4 tin 8 cyuc 4 kcaak 0 tcan 1 dwat 0.5 m hkuc hmimhtut cyuti tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Stachys affinis* is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf from May to November, in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves RootEdible Uses: Tubers - raw or cooked[1, 2, 4, 16, 33]. Quite a pleasant mild flavour and easily digested[46], but fairly small and fiddly[K], they are about 5 - 8cm long and 2cm wide[200, 206]. A nutty artichoke-like flavour[183], it can be eaten raw on its own, be added to salads or be lightly cooked[K]. The tubers quickly discolour when exposed to the air[200] and are said to lose their flavour if they are peeled[183]. It is best to harvest them as required[206]. Yields are about 1kg per square metre[200]. Leaves - cooked. A famine food, they are only used when all else fails[179].

dwatta AnodyneThe dried and powdered root is anodyne[218]. The entire plant has been used in the treatment of colds and pneumonia[266].

nrakta E. Asia - China, Japan. ksacta Wet and submersed areas; 0-3200 m. Gansu, Hebei, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Xinjiang[266]

propta Seed - sow spring in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle. If sufficient growth has been made, it is possible to plant them out during the summer, otherwise grow them on in pots for their first summer, leaving the tubers in the pots to overwinter in a cold frame and then plant out in late spring when in active growth. Seed is rarely if ever produced on plants growing in Britain. Division. The tubers can be harvested and replanted at any time whilst they are dormant. They do start into growth fairly early in the year so it is better to have moved them by the end of March[K].

nwatta Prefers a well-drained soil in a sunny position[16]. Thrives in an ordinary garden soil[1], preferring one that is not too heavy[16, 33]. It grows best in a soil that has been well fed and does not dry out in the growing season[16]. Plants seem to withstand even water-logged conditions in the winter[206]. The Chinese artichoke is occasionally cultivated for its edible tubers, they are planted out in March and harvested from October onwards[1, 58, 61]. Although top growth is killed back by frost, the tubers are very hardy and can be left in the ground over winter to be harvested as required[200]. It is virtually impossible to find all the tubers, there are always some left behind that will grow the following season[K]. Plants are very tolerant of high summer temperatures[206]. The tubers begin to sprout at temperatures above about 5°C[206]. Plants take 5 - 7 months to develop their tubers[206]. Plants rarely flower in Britain[1]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

Plants produced from cuttings come into fruit when much younger, though they do not live as long as the seedlings. A very ornamental plant[1] it flowers quite early in the year and is a valuable early food for bees[13, 108]. Plants in this genus are notably resistant to honey fungus[200].Special Features:Attracts birds, Not North American native, Attractive flowers or blooms. The plant is heat tolerant in zones 8 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

5.2.61 Crambe maritima

Sea Kale

4 tin 8 cyuc 4 kcaak 3 tcan 0 dwat m hkuc hmimhtut cyuti hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli prikliwssom hpa7tmwatli fyifxre7t hjonli

drutta *Crambe maritima* is a PERENNIAL growing to 0.6 m (2ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: neutral and basic (mildly alkaline) soils and can grow in saline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

kcakta Edible Parts: Flowers Leaves Root ShootsEdible Uses: Young leaves - raw or cooked like spinach[9, 12, 37, 52, 183]. They have a pleasant almost nutty flavour and go well in a mixed salad[K]. They also make a very pleasant cooked vegetable[K]. Older leaves develop a bitterness and are not so pleasant[K]. Young shoots - raw or cooked[2, 5, 37, 46, 183]. Available in the spring, they have a delicate nutty flavour with a crisp texture[200, 264]. The shoots are usually blanched and can be cooked like asparagus[9, 183]. When properly cooked they retain their crispness and have a very agreeable flavour, somewhat like hazelnuts but with a slight bitterness[183]. Root - cooked. Rich in starch and sugars[74]. Young flower buds - raw or cooked[264]. The flowering shoots are harvested when about 10 - 15cm long and before the flowers have opened. Used like sprouting broccoli, they are quite nice raw and delicious when lightly steamed[K].

tcanta Plants can be used for ground cover when spaced about 60cm apart each way[208].

nrakta Atlantic coast of Europe, including Britain, along the Baltic coast and around the Black Sea. ksacta Coastal sands, shingle, rocks and cliffs near the sea, often on the drift line[17].

propta Seed - sow March/April in a seedbed outdoors and either thin the plants out or move them to their permanent positions when about 10cm tall[111]. Plants can be cropped once they are more than 12 months old[264]. The young plants are very attractive to slugs so some protection will often be needed. Germination can be slow so it is best to sow the seed in pots in a cold frame[164]. Germination usually takes place in 3 - 26 weeks at 15°C[164]. Prick out the seedlings into individual pots as soon as they are large enough to handle and plant out into their permanent positions when they are at least 10cm tall. Division in spring or autumn[1, 111]. Dig up the root clump and cut off as

many sections as you require, making sure they all have at least one growing point. The larger of these divisions can be planted out straight into their permanent positions, though small ones are best potted up and grown on in a cold frame until they are established. Root cuttings, 3 - 10 cm long, in spring[104]. These can be planted straight into the open ground or you can pot them up in the greenhouse and plant them out once they are growing strongly.

nwatta An easily grown plant, succeeding in a good loam and an open sunny position[1, 111, 200] but also tolerating some shade[188]. Prefers a slightly alkaline soil in a position sheltered from strong winds[200] (this report totally conflicts with the plants native habitat which is on sea shores - we have found this species to be very tolerant of strong maritime winds though it does not like cold northerlies much[K]). Tolerates poor soil and some shade[200]. Dislikes acid[1] and very stiff soils[37]. Prefers a rich , well-drained very deep sandy loam and a pH of 7[104, 264]. Established plants are very drought tolerant[190]. This species is hardy to about -20°C[187], it grows best in a cool maritime climate[200]. Seakale is sometimes cultivated for its edible young shoots in the spring which are blanched by excluding light in order to make them less bitter[61, 264]. Two or three crops can usually be harvested each year[264]. There are some named varieties[183]. The roots are sometimes brought into a greenhouse in the winter and grown on there in order to produce an early crop of shoots[183]. A deep-rooted and very long-lived plant[233, 264], it dislikes root disturbance[164]. The seed is dispersed by seawater, on which it can float for several days without loss of viability[17]. A good bee plant[115]. The plant is heat tolerant in zones 9 through 6. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

5.2.62 Rhus typhina

Stag's Horn Sumach, Velvet Sumach, Staghorn Sumac

4 tin 8 cyuc 4 kcaak 3 tcan 2 dwat 6 m hkuc htut cyuti hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli nyanhjen hjonli

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

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

kcakta Edible Parts: Fruit OilEdible Uses: Drink Oil-Fruit - cooked[22, 62]. A very sour flavour, they are used in pies[183]. The fruit is rather small and with very little flesh, but it is produced in quite large clusters and so is easily harvested. When soaked for 10 - 30 minutes in hot or cold water it makes a very refreshing lemonade-like drink (without any fizz of course)[55, 85, 95, 101, 102, 183]. The mixture should not be boiled since this will release tannic acids and make the drink astringent.

tcanta Dye Hedge Hedge Ink Mordant Musical Oil Pipes Shelterbelt Soil stabilization Tannin WoodThe leaves are rich in tannin, up to 48% has been obtained in a controlled plantation[223]. They can be collected as they fall in the autumn and used as a brown dye or as a mordant[169, 171]. The bark, especially the root bark, and the fruits are also very rich in tannin[82, 159, 169]. A yellow dye can be obtained from the roots[257]. An orange dye can be obtained from the inner bark and central pith of the stem, mixed with bloodroot (*Sanguinaria canadensis*)[257]. A black ink can be made by boiling the leaves and the fruit[226]. An oil is extracted from the seeds[4]. It attains a tallow-like consistency on standing and is used to make candles. These burn brilliantly, though they emit a pungent smoke[4]. Pipes are made from the young shoots and are used for drawing the sap of sugar maples (*Acer spp*) [82]. They are also used as flutes[159]. The plant has an extensive root system and is planted as a windbreak screen and to prevent soil erosion[200]. Wood - soft, light, brittle, coarse grained[82, 101]. It weighs 27lb per cubic foot[235]. Of no commercial value, though it is sometimes used as a rough construction wood or is employed in turning[226].

dwatta Antihæmorrhoidal Antiseptic Astringent Blood purifier Diuretic Emetic Galactogogue Poultrice Stomachic Tonic VD WartsStag's horn sumach was often employed medicinally by several native North American Indian tribes who valued it especially for its astringent qualities[257]. It is little used in modern herbalism. Some caution is advised in the use of the leaves and stems of this plant, see the notes above on toxicity. The bark is antiseptic, astringent, galactogogue and tonic[222, 257]. An infusion is used in the treatment of diarrhoea, fevers, piles, general debility, uterine prolapse etc[213, 222]. An infusion is also said to greatly increase the milk flow of a nursing mother - small pieces of the wood were also eaten for this purpose[257]. The inner bark is said to be a valuable remedy for piles[257]. The roots are astringent, blood purifier, diuretic and emetic[222]. An infusion of the roots, combined with purple coneflower (*Echinacea purpurea*) has been used in the treatment of venereal disease[257]. A poultice of the roots has been used to treat boils[257]. The leaves are astringent. They have been used in the treatment of asthma, diarrhoea and stomatitis[222]. An infusion of the fruits has been used as a tonic to improve the appetite and as a treatment for diarrhoea[257]. The berries are astringent and blood purifier[257]. They were chewed as a remedy for bed-wetting[222, 257]. A tea made from the berries has been used to treat sore throats[213]. The flowers are astringent and stomachic. An infusion has been used to treat stomach pains[257]. The sap has been applied externally as a treatment of warts[226]. Some caution is advised here since the sap can cause a rash on many people[K].

nrakta Eastern N. America - New Brunswick to the southern Appalachian mountains and west to Iowa. ksacta Usually found in upland sites on rich soils, but it is also found in gravel and sandy nutrient-poor soils. It grows by streams and swamps, along roadsides, railway embankments and edges of woods[229].

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

nwatta Landscape Uses:Border, Massing, Specimen. Succeeds in a well-drained fertile soil in full sun[11, 200]. Tolerates poor soils[169, 200]. Succeeds in dry soils and is drought resistant once it is established[169]. A fairly wind hardy plant, though the branches are brittle and can be broken off in very high winds[200, K]. A very hardy plant, when fully dormant it can tolerate temperatures down to at least -25°C[200]. However, the young growth in spring can be damaged by late frosts. A fast growing but short-

lived tree[159], it can sucker freely, forming thickets and becoming quite anti-social when grown in small areas[11]. Single-stem plants are short-lived in cultivation, but if the plants are coppiced regularly and allowed to form thickets, then they will live longer and also be more ornamental with larger leaves[238]. Any coppicing is best carried out in early spring[238]. A very ornamental plant, there are some named varieties[182]. It is susceptible to coral spot fungus[11] but is notably resistant to honey fungus[88, 200]. It transplants easily[169]. This is a very good bee plant, the flowers producing an abundance of pollen and nectar[226]. There is some doubt over the validity of this name and the earlier *R. hirta*. [L.] has been proposed as the correct name. However, it seems likely that *R. typhina* will be retained because it is so well known[214]. This species is closely related to and hybridizes with *R. glabra*[101]. Many of the species in this genus are highly toxic and can also cause severe irritation to the skin of some people, whilst other species such as this one are not poisonous. It is relatively simple to distinguish which is which, the poisonous species have axillary panicles and smooth fruits whilst non-poisonous species have compound terminal panicles and fruits covered with acid crimson hairs[1, 4]. The toxic species are sometimes separated into their own genus, *Toxicodendron*, by some botanists[200]. Dioecious. Male and female plants must be grown if seed is required. Special Features: Attracts birds, North American native, Attractive flowers or blooms. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a running thicket former forming a colony from shoots away from the crown spreading indefinitely [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

5.2.63 Crataegus durobrivensis

Caughuawaga Hawthorn

4 tlin 8 cyuc 4 kcaak 2 tcan 2 dwat 5 m hkuc hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatprikwisslip hpa7tmwatli xre7t hjonli

drutta Crataegus durobrivensis is a deciduous Shrub growing to 5 m (16ft) by 5 m (16ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Midgees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. A reasonable size, it is up to 15mm in diameter[200], and is very acceptable for raw eating[K]. It is sweet and fairly juicy when fully ripe with a hint of apple in its flavour[K]. The fruit can be used in making pies, preserves, etc, and can also be dried for later use. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta North-eastern N. America. ksacta Not known in a truly wild situation, it is possibly a hybrid *C. prinuosa* x *C. suborbiculata*[43].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year.

is astringent and is used in the treatment of diarrhoea and excessive menstrual bleeding[222].

nrakta Cetral and southeastern Europe, including Britain, as far north as Scandinavia and Iceland. ksacta Heaths and acid grasslands[17]. A weed of acid soils[17, 55].

propta Seed - sow autumn or spring in situ. Division in spring.

nwatta Succeeds in most soils[37], preferring a moist moderately fertile well-drained soil in a sunny position[200]. Although a plant of acid soils, it can tolerate some alkalinity[17]. A good food plant for the caterpillars of many species of butterflies[24, 30], it grows well in the summer meadow[24]. Dioecious. Male and female plants must be grown if seed is required. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A clumping mat former. Forming a dense prostrate carpet spreading indefinitely [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2].

5.2.97 Valerianella locusta

Corn Salad, Lewiston cornsalad

4 tlin 8 cyuc 4 kcaak 0 tcan 0 dwat 0.3 m hkuc htut cyutli kyuctup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyfxre7t hjonli

drutta Valerianella locusta is an ANNUAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to June, and the seeds ripen from May to July. The species is hermaphrodite (has both male and female organs). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: Flowers LeavesEdible Uses: Young leaves - raw[1, 2, 4, 5, 12, 27, 33, 37]. A very mild flavour, with a delicate quality that makes them seem to melt in the mouth, they can be added in quantity to salads[183]. The leaves can be available all year round from successional sowings and will only require protection in the colder winters[K]. Flowers and flowering stems - raw[183].

nrakta Europe, including Britain, from Scandinavia south and east to N. Africa and W. Asia. ksacta Cultivated ground, waste places, hedgebanks, dunes etc, usually on dry soils[9, 17].

propta Seed - in order to obtain a continuous supply of salad leaves, it is best to sow the seed successively from early spring to late summer in situ. A late summer sowing might also succeed, and this would supply edible leaves in the winter.

nwatta A very easily grown plant, it prefers a fairly rich light soil[1, 37] though it tolerates most soils and wet or dry conditions[52]. Prefers a sunny position but tolerates some shade in summer[K]. This shade, plus an adequate supply of water, will slow down the plant's tendency to run to seed[200]. Late sowings will benefit from a sheltered sunny position and perhaps some protection in the winter. Often cultivated on a garden scale for its edible young leaves which, by successional sowing, can be available for most of the year although they will require protection in severe winters. There are several named varieties[183]. The plants do tend to run quickly to seed in the summer though. If allowed to flower, plants will often maintain themselves by self-sowing[K].

5.2.98 Mentha x villosa alopecuroides

Apple Mint, Bowles' Mint

4 tlin 8 cyuc 4 kcaak 3 tcan 2 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Mentha x villosa alopecuroides is a PERENNIAL growing to 0.6 m (2ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and

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

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

kcakta Edible Parts: LeavesEdible Uses: Condiment TeaLeaves - raw or cooked[14]. A strong spearmint flavour, they are used as a flavouring in salads or cooked foods[183], this is also the main species that is used to make mint sauce. A herb tea is made from the fresh or dried leaves[21, 183].

tcanta Essential Repellent StrewingAn essential oil is obtained from the whole plant. The plant repels insects and was formerly used as a strewing herb[14, 18, 20]. Rats and mice intensely dislike the smell of mint. The plant was therefore used in homes as a strewing herb and has also been spread in granaries to keep the rodents off the grain[244].

dwatta Antiseptic Carminative FebrifugeApple mint, like many other members of this genus, is often used as a domestic herbal remedy, being valued especially for its antiseptic properties and its beneficial effect on the digestion. Like other members of the genus, it is best not used by pregnant women because large doses can cause an abortion. A tea made from the leaves of most mint species has traditionally been used in the treatment of fevers, headaches, digestive disorders and various minor ailments[222]. The leaves are harvested as the plant comes into flower and can be dried for later use[238]. The essential oil in the leaves is antiseptic, though it is toxic in large doses[222].

nrakta Central and southern Europe, including Britain, Mediterranean region, Azores.. ksacta Roadsides and in ditches in the S. and W. of England[5, 17]. Probably a hybrid, *M. spicata* x *M. suaveolens*.

propta Seed - sow spring in a cold frame. Germination is usually fairly quick. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. *Mentha* species are very prone to hybridisation and so the seed cannot be relied on to breed true. Even without hybridisation, seedlings will not be uniform and so the content of medicinal oils etc will vary. When growing plants with a particular aroma it is best to propagate them by division[K]. Division can be easily carried out at almost any time of the year, though it is probably best done in the spring or autumn to allow the plant to establish more quickly. Virtually any part of the root is capable of growing into a new plant. Larger divisions can be planted out direct into their permanent positions. However, for maximum increase it is possible to divide the roots up into sections no more than 3cm long and pot these up in light shade in a cold frame. They will quickly become established and can be planted out in the summer.

nwatta A very easily grown plant, it succeeds in most soils and situations so long as the soil is not too dry[1, 200]. Grows well in heavy clay soils. Prefers a slightly acid soil[16]. A sunny position is best for the production of essential oils, but the plant also succeeds in partial shade. Apple mint is commonly grown in the herb garden. There is at least one named variety, 'Bowles mint' is said to be a superior form and it is the form usually cultivated commercially for mint sauce. Unlike most members of the genus, this species is resistant to the disease 'rust'[238]. Most mints have fairly aggressive spreading roots and, unless you have the space to let them roam, they need to be restrained by some means such as planting them in containers that are buried in the soil[K]. Hybridizes freely with other members of this genus. The whole plant has a strong aroma of spearmint. The flowers are very attractive to bees and butterflies[24]. A good companion for growing near cabbages and tomatoes, helping to keep them free of insect pests[14, 20]. Members of this genus are rarely if ever troubled by browsing deer[233]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2].

5.2.95 *Chenopodium bonus*

Good King Henry

4 tlin 8 cyuc 4 kcaak 1 tcan 2 dwat 0.3 m hkuc
htut cyutili tcup hwicli hrasjlutnyik hpa7tli flatprikliwis
hpa7tmwatli xre7t hjonli

drutta *Chenopodium bonus-henricus* is a PERENNIAL growing to 0.3 m (1ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to July, and the seeds ripen from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista The leaves and seeds of all members of this genus are more or less edible. However, many of the species in this genus contain saponins, though usually in quantities too small to do any harm. Although toxic, saponins are poorly absorbed by the body and most pass straight through without any problem. They are also broken down to a large extent in the cooking process. Saponins are found in many foods, such as some beans. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K]. The plants also contain some oxalic acid, which in large quantities can lock up some of the nutrients in the food. However, even considering this, they are very nutritious vegetables in reasonable quantities. Cooking the plants will reduce their content of oxalic acid. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcaakta Edible Parts: Flowers Leaves SeedEdible Uses: Young leaves - raw or cooked[2, 5, 7, 9, 12, 33]. The leaves wilt quickly after picking and so they need to be used as soon after harvesting as possible[264]. They can be used as a potherb[4]. The leaves are best in spring and early summer, the older leaves become tough and bitter[200]. The raw leaves should only be eaten in small quantities, see the notes above on toxicity. Young leaves can be chopped and used as a small part of mixed salads, though we are not enamoured by their flavour[K]. The cooked leaves make an acceptable spinach substitute, but are best mixed with nicer leaves[K]. The leaves are a good source of iron[244]. Young flowering shoots - cooked[2, 27, 132, 264]. When grown on good soil, the shoots can be as thick as a pencil[4]. When about 12cm long, they are cut just under the ground, peeled and used like asparagus[183]. A very pleasant spring vegetable[K]. The plant is sometimes blanched by excluding the light in order to produce a longer and more succulent shoot, though this practice also reduces the quantity of vitamins in the shoots[264, K]. Young flower buds - cooked[33, 183]. Considered to be a gourmet food[183], though they are rather small and harvesting any quantity takes quite a while[K]. Seed - ground and mixed with flour then used in making bread etc. The seed is small and fiddly but is easily harvested[K]. It should be soaked in water overnight and thoroughly rinsed before it is used in order to remove any saponins[K].

tcanta DyeGold/green dyes can be obtained from the whole plant[168].

dwatta Emollient Laxative VermifugeThe herb is emollient, laxative and vermifuge[7, 154]. This remedy should not be used by people suffering from kidney complaints or rheumatism[7]. A poultice of the leaves has been used to cleanse and heal chronic sores, boils and abscesses[4, 7]. The seed is a gentle laxative that is suitable for children[7].

nrakta Most of Europe, including Britain, north to Scandinavia, W. Asia, N. America. ksacta Rich pastures, farmyards, roadsides etc[17].

propta Seed - sow spring in a cold frame. Germination can be slow, but usually a high percentage will germinate[K]. These seeds germinate best at 20C. Cold stratification of up to 9 weeks at 4C prior to exposure at 20C will increase the germination rate. Prick out the seedlings into individual pots as soon as they are large enough to handle and plant out into their permanent positions in the summer. Division in spring[200]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the summer or following spring.

nwatta Historic Grain Crop Management: Standard Staple Crop: Balanced carbPrefers a fertile humus rich soil in a sunny position[9, 16, 200]. The plant produces a better quality harvest in the summer if it is grown in light shade[264, K]. A very easily grown plant, it tolerates considerable neglect and succeeds in most soils and situations[16, 33, K]. Good King Henry was at one time frequently cultivated in the garden as a perennial vegetable, but it has fallen out of favour and is seldom grown at present[4, 46]. About thirty plants can produce a good supply of food for four people[264]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

5.2.96 *Rumex acetosella*

Sheeps Sorrel, Common sheep sorrel

4 tlin 8 cyuc 4 kcaak 1 tcan 3 dwat 0.3 m hkuc
hmimhtut cyutili tcup hwicli hrasjlutnyik hpa7tli frusflatprikliwis
hpa7tmwatli nyanhjen hjonli

drutta *Rumex acetosella* is a PERENNIAL growing to 0.3 m (1ft) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to August, and the seeds ripen from July to September. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

pcista Plants can contain quite high levels of oxalic acid, which is what gives the leaves of many members of this genus an acid-lemon flavour. Perfectly alright in small quantities, the leaves should not be eaten in large amounts since the oxalic acid can lock-up other nutrients in the food, especially calcium, thus causing mineral deficiencies. The oxalic acid content will be reduced if the plant is cooked. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcaakta Edible Parts: Leaves Root SeedEdible Uses: DrinkLeaves - raw or cooked[4, 12, 55, 62, 183]. A delicious lemon-like flavour, most people consider them too strong to use in quantity, but they are excellent as a flavouring in mixed salads[K]. The leaves should only be used in small quantities due to the oxalic acid content. The leaves can be used as thickeners in soups etc[102], they can also be dried for later use[12]. Root - cooked. It can be dried, ground into a powder and made into noodles[105]. Seed - raw or cooked[172]. Easy to harvest, but the seed is rather small and fiddly to use[K]. A drink similar to lemonade (but without the fizz) is made by boiling up the leaves[102].

tcanta DyeDark green to brown and dark grey dyes can be obtained from the roots, they do not need a mordant[168]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Astringent Diuretic Poulitice UrinarySheep's sorrel is a detoxifying herb, the fresh juice of the leaves having a pronounced diuretic effect[254]. Like other members of the genus, it is mildly laxative and holds out potential as a long term treatment for chronic disease, in particular that of the gastro-intestinal tract[254]. The plant is also part of a North American formula called essiac which is a popular treatment for cancer. Its effectiveness has never been reliably proven or disproven since controlled studies have not been carried out. The other herbs included in the formula are *Arctium lappa*, *Ulmus rubra* and *Rheum palmatum*[254]. The whole plant, used in the fresh state, is diaphoretic, diuretic and refrigerant[222]. A tea made from the leaves is used in the treatment of fevers, inflammation and scurvy[222]. The leaf juice is useful in the treatment of urinary and kidney diseases[4]. A leaf poultice is applied to tumours, cysts etc. and is a folk treatment for cancer[222]. A tea made from the roots

Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. A very hardy plant, tolerating temperatures down to about -18°C[202]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. Probably a natural hybrid, *C. pruinosa* x *C. suborbiculata*[43].

5.2.64 *Chaenomeles cathayensis*

Chinese Quince

4 tlin 8 cyuc 4 kcaak 0 tcan 2 dwat 3 m hkuc
hmimhtut cyutili tcup hwicli hrasjlutnyikfrip hpa7tli flatprikliwis
hpa7tmwatli xre7t hjonli

drutta *Chaenomeles cathayensis* is a deciduous Shrub growing to 3 m (9ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in April, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. It can tolerate atmospheric pollution.

kcaakta Edible Parts: FruitEdible Uses: Fruit - very harsh raw but fragrant when cooked[1, 3, 4, 11, 177]. It makes an excellent jelly[183] and a very good jam, it is especially good cooked with apples in apple pies[K]. The fruit is very large and can be 15cm long and 9cm wide[200].

dwatta Antiemetic Antirheumatic Antispasmodic DigestiveThe fruit is antiemetic, antirheumatic, antispasmodic and digestive[176]. It is used in the treatment of rheumatic pain, convulsions of the calf muscles, vomiting, dyspepsia and diarrhoea[176].

nrakta E. Asia - China. ksacta Scrub and hedges in W. Hubei[184]. Slopes, forest margins and roadsides at elevations of 900 - 2500 metres[266].

propta Seed - best sown as soon as it is ripe in a sheltered position outdoors or in a cold frame[200]. Sow stored seed in February in a greenhouse[78]. Germination usually takes place within 6 weeks[78]. Prick out the seedlings into individual pots as soon as they are large enough to handle. If well grown, these seedling can be large enough to plant out in the summer, but give them some protection in their first winter. Otherwise plant them out in late spring of the following year[K]. Cuttings of half-ripe wood, July/August in

a frame[11]. Cuttings of mature wood of the current year's growth, November in a cold frame. Layering in late spring or in autumn. This is a sure and easy method, though it takes 12 months[78, 200].

nwatta Easily cultivated in any reasonably good soil[1, 200]. Prefers a deep moist well-drained loam[4, 11]. Grows well in heavy clay soils. Tolerates full shade but requires a sunny position for best fruit production[3, 11, 200]. Becomes chlorotic on very alkaline soils[188, 200]. Tolerates atmospheric pollution[200]. A very ornamental plant[1], it is hardy to about -25°C[200]. Plants are subject to canker, especially when growing in the milder moister areas of Britain[49]. Plants in this genus are notably resistant to honey fungus[200]. Fruits are usually freely produced in Britain, but they do not always ripen[11, 182]. The plant grows and fruits well on a south wall at Kew[K]. A good bee plant, flowering early in the year and providing pollen and nectar[108]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

5.2.65 *Sambucus caerulea*

Blue Elder

4 tlin 8 cyuc 4 kcaak 3 tcan 2 dwat 3 m hkuc
hmimhtut cyutili kyuctcup hwicli hrasjlutnyikfrip hpa7tli flatprikliwis
hpa7tmwatli xre7t hjonli

drutta *Sambucus caerulea* is a deciduous Shrub growing to 3 m (9ft 10in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to July, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

pcista The leaves, green fruits and stems of some (if not all) members of this genus are poisonous[9, 76, 226]. The fruit of this species has been known to cause stomach upsets to some people. Any toxin the fruit might contain is liable to be of very low toxicity and is destroyed when the fruit is cooked[65, 76].

kcaakta Edible Parts: Flowers FruitEdible Uses: TeaFruit - raw, cooked or used in preserves[2, 3, 15, 85, 94, 183, 257]. Rather sweet and juicy but full of small seeds[82, 256], this is the best flavoured of the North American elders[212]. The fruit is rather nice raw, seven people ate and enjoyed a small quantity of the raw fruit with no ill effects[K]. The fruit can be dried for later use[257]. A somewhat rank taste fresh[101], the fruit is usually dried before being used[183]. The fruit is about 6mm in diameter and is borne in large clusters[200]. Some caution is advised, see the notes above on toxicity. Flowers - raw or cooked in fritters etc[15, 85, 94, 183]. Very pleasant and refreshing raw[K]. A pleasant tea is made from the dried flowers[62, 183].

tcanta Musical Repellent Tinder WoodA decoction of the leaves, when watered on plants, repels caterpillars[94]. The dried flower stems repel insects and rodents[101]. The hollow stems can be used as flutes and pipes[257]. The pith of the stems has been used as a tinder for lighting fires[257]. Wood - light, soft, weak, coarse grained. Of no commercial value, though it is used locally for flutes, skewers, pegs, straws etc[82, 94, 99, 229].

dwatta Analgesic Antiseptic Astringent Diaphoretic Emetic Fibrifuge Haemostatic Laxative Pectoral Salve Stomachic TonicHaemostatic[94]. An infusion or extract made from the flowers, bark and root has been used to cure fevers and gripe, it is also laxative[226]. A decoction of the plant has been used as an antiseptic wash to treat itches[257]. The bark is analgesic and astringent[257]. An infusion has been used in the treatment of diarrhoea and rheumatism[257]. A decoction has been used as a wash in the treatment of swellings and pain[257]. An ointment made by mixing the bark with fat has been used externally in the treatment of burns, ulcers, skin irritations etc[226]. The fresh

bark has been placed in a tooth cavity to ease the pain of toothache[257]. The inner bark is strongly emetic[257]. The leaves are analgesic, antiseptic, diaphoretic, febrifuge and purgative[257]. A decoction has been used in the treatment of new colds[257]. An infusion of the leaves and flowers has been used as a steam bath in the treatment of colds and headaches[257]. A decoction of the leaves has been used as an antiseptic wash on limbs affected by blood poisoning[257]. The crushed leaves have been used as a poultice to treat burns and swollen hands[257]. A decoction of the root has been used in the treatment of bladder problems and dyspepsia[257]. A decoction of the flowers has been used in the treatment of stomach troubles and lung complaints[257]. Applied externally, it has been used to treat sprains and bruises and as an antiseptic wash for open sores and itches[257]. A wine made from the fruit has been used as a tonic[257].

nrakta Western N. America - British Columbia to California, east to Montana, Texas and Mexico. ksacta Gravelly, rather dry soils on stream banks, margins of fields, woodlands etc[62, 82].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame, when it should germinate in early spring. Stored seed can be sown in the spring in a cold frame but will probably germinate better if it is given 2 months warm followed by 2 months cold stratification first[78, 98, 113]. Prick out the seedlings into individual pots when they are large enough to handle. If good growth is made, the young plants can be placed in their permanent positions during the early summer. Otherwise, either put them in a sheltered nursery bed, or keep them in their pots in a sheltered position and plant them out in spring of the following year. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame[78]. Cuttings of mature wood of the current season's growth 15 - 20cm with a heel, late autumn in a frame or a sheltered outdoor bed[78].

nwatta Tolerates most soils, including chalk[200], but prefers a moist loamy soil[11, 200]. Grows well in heavy clay soils. Tolerates some shade but is best in a sunny position[11]. Tolerates atmospheric pollution and coastal situations[200]. A fast-growing but short-lived tree in the wild[229]. A shrub at Kew in September 1993 was carrying a good crop of tasty fruits[K]. Plants in this genus are notably resistant to honey fungus[200].

5.2.66 Helianthus hybrids

Perennial Sunflower

4 tin 11 cyuc 4 kcaak 2 tcan 2 dwat 3.6 m hkuc htut cyutli kyucup hwicli hyishrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli hjonli

drutta Helianthus hybrids is a PERENNIAL growing to 3.6 m (11ft) by 0.6 m (2ft in) at a fast rate. See above for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

ksacta Edible Parts: Flowers Oil Seed StemEdible Uses: Drink OilCarbon Farming Solutions - Staple Crop: protein-oil (The term staple crop typically refers to a food that is eaten routinely and accounts for a dominant part of people's diets in a particular region of the world)[1-1]. Perennial crops are being developed for their oil-seed. The Land Institute see them as part of a perennial polyculture system [1-1].

tcanta Biomass OilSee individual species. Some sunflowers are a good source of biomass. The tubers are used in industry to make alcohol etc[141]. The alcohol fermented from the tubers is said to be of better quality than that from sugar beets[269]. Can be grown as a temporary summer screen[200]. Ornamental. A food plants for the larvae of many lepidopterans.

dwatta Various medicinal qualities depending on the species.

nrakta Origin: hybrid. All Helianthus species are native to North America except for three species in South America. ksacta Cold to semi-arid regions.

propta See individual species.

nwatta Management: Standard Staple Crop: Protein-oil Under DevelopmentClimate: boreal to warm temperate. Humidity: semi-arid to humid. Carbon Farming Solutions

- Cultivation: under development. Management: standard (Describes the non-destructive management systems that are used in cultivation) [1-1]. Perennial crops are being developed for their oil-seed. The Land Institute see them as part of a perennial polyculture system [1-1]. Several perennial sunflowers are being worked with including prairie natives handling boreal to warm temperate semi-arid conditions: Helianthus maximiliani (Maximilian sunflower), Helianthus tuberosus (Jerusalem artichoke), Helianthus pauciflorus (Stiff sunflower). Less tolerant of boreal conditions but good on poor soils is Helianthus cusickii (Cusick's sunflower) [1-1].

5.2.67 Lonicera angustifolia

Narrow-leaved honeysuckle

4 tin 8 cyuc 4 kcaak 2 tcan 0 dwat 2.7 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyixre7t hjonli

drutta Lonicera angustifolia is a deciduous Shrub growing to 2.7 m (8ft 10in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to May, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

ksacta Edible Parts: FruitEdible Uses: Fruit - raw[11, 51, 158, 200, 272]. Sweet and pleasant tasting, the fruit is a bit smaller than a blackcurrant[K]. Plants often produce a second crop in late summer[K].

tcanta WoodWood - hard, very close grained. Used for walking sticks[158, 272].

nrakta E. Asia - Himalayas. ksacta Forests and shrubberies, under oak, fir and deodar, to elevations of 3600 metres[51, 146].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed requires 2 months cold stratification[113] and should be sown as soon as possible in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm with or without a heel, July/August in a frame. Good percentage[78]. Cuttings of mature wood of the current season's growth, 15 - 20cm with or without a heel, November in a cold frame. Good percentage[78]. Layering in autumn[200].

nwatta An easily grown plant, it grows best in a good moist soil in a sunny position, it does not fruit so well in the shade[200]. Plants are fairly wind tolerant[K]. Plants flower and fruit better in hotter climates than Britain[182]. Plants have been seen bearing good crops of fruit in eastern Britain, though we have only managed to produce light crops on our Cornish trial grounds[K]. The flowers have a soft 'honeysuckle' perfume[245]. This species is closely related to *L. myrtillus* [11].

5.2.68 Ribes odoratum

Buffalo Currant

4 tin 8 cyuc 4 kcaak 0 tcan 1 dwat 2.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Ribes odoratum is a deciduous Shrub growing to 2.5 m (8ft) by 2.5 m (8ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in April, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

ksacta Edible Parts: Flowers FruitEdible Uses: Condiment TeaFruit - raw or cooked[2, 62, 85, 257]. The quality varies from plant to plant, the best forms are sweet and make very pleasant eating[K]. The fruit ripens from late July and

dwatta Antidote Diuretic Vitamin CThe juice of the roots is an effective antidote in cases of arsenic poisoning[205]. A tea made from the boiled roots is used as a diuretic[205].

nrakta E. Asia - N. China, Japan, Korea. ksacta Mountains in C. and S. Japan[58].

propta Seed - sow in the middle of spring in a greenhouse. Germination is usually fairly rapid and good. Prick out the seedlings into individual pots when they are large enough to handle. Grow the plants on for their first winter in a greenhouse and plant out in late spring[K]. Division in spring or after flowering in late summer or autumn[200]. Division is very quick and easy, succeeding at almost any time of the year[K]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Succeeds in most soils[1], including dry ones, preferring a rich moist soil and a sunny position[111] but tolerating partial shade[88]. Plants flower less freely in a shady position though the flowers can last longer in such a position[205]. Grows well in heavy clay soils. Succeeds in short grass if the soil is moist[1]. Prefers a pH between 6 and 7[200]. Hybridizes freely with other members of this genus[200]. Plants take a year or two to become established after being moved[200]. They increase by means of runners[205] and form loose spreading clumps[K]. The roots are not swollen[233]. Plants seem to be immune to the predations of rabbits[233]. The plants are very susceptible to slug and snail damage, the young growth in spring is especially at risk[200]. The fragrant flowers are very short-lived, they open in the late afternoon and die in the morning[200, 205]. However, plants produce a succession of flowers for several weeks of the summer, each scape carrying between 4 and 20 blooms[205].

5.2.93 Aralia nudicaulis

Wild Sarsaparilla

4 tin 8 cyuc 4 kcaak 3 tcan 3 dwat 0.4 m hkuc pcmhmm cyutli tcup hwicli hyishrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Aralia nudicaulis is a PERENNIAL growing to 0.4 m (1ft 4in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in June, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

ksacta Edible Parts: Fruit Leaves Root ShootsEdible Uses: Condiment TeaThe rootstock is used as a flavouring[102], it is a substitute for sarsaparilla[43] and is also used for making 'root beer'[183]. It is also used as an emergency food[177] (usually mixed with oil[257]), having a sweet spicy taste and a pleasant aromatic smell[4]. A nutritious food[207], it was used by the Indians during wars or when they were hunting since it is very sustaining[213]. Young shoots - cooked as a potherb[207]. A refreshing herbal tea is made from the root[183]. Pleasantly flavoured[222, 238]. The roots are boiled in water until the water is reddish-brown[256]. A jelly is made from the fruit[207]. The fruit is also used to make wine[257]. The fruit is about 6mm in diameter[200]. The fruit is a round, purplish-black berry.

tcanta Groundcover. Wildlife - food source. A specialist nectary plant [1-2].

dwatta Alterative Diaphoretic Diuretic Eczema Homeopathy Pectoral StimulantWild sarsaparilla is a sweet pungent tonic herb that acts as an alterative. It had a wide range of traditional uses amongst the North American Indians and was at one time widely used as a substitute for the tropical medicinal herb sarsaparilla[222, 257]. The root is alterative, diaphoretic, diuretic, pectoral and stimulant[4, 21, 213, 222]. The herb encourages sweating, is stimulating and detoxifying and so is used internally in the treatment of pulmonary diseases, asthma, rheumatism, stomach aches etc[4, 213, 238, 254, 257]. Externally it is used as a poultice in treating rheumatism, sores, burns, itchy skin, ulcers and skin problems such as eczema[4, 222, 254]. The root is collected in late summer and the autumn and dried for later

use[4, 213]. A drink made from the pulverised roots is used as a cough treatment[213]. A poultice made from the roots and/or the fruit is applied to sores, burns, itchy skin, ulcers, swellings etc[213, 222]. A homeopathic remedy made from the roots is important in the treatment of cystitis[238].

nrakta N. America - Newfoundland to Manitoba, south to N. Carolina and Missouri. ksacta Moist, shady, rocky woods[4, 21].

propta Seed - best sown as soon as ripe in a cold frame. Stored seed requires 3 - 5 months of cold stratification. Germination usually takes place within 1 - 4 months at 20°C[134]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in a greenhouse for at least their first winter. Once the plants are 25cm or more tall, they can be planted out into their permanent positions, late spring or early summer being the best time to do this. Root cuttings 8cm long, December in a cold frame[11, 78]. Store the roots upside down in sand and pot up in March/April. High percentage[78]. Division of suckers in late winter[11]. Very easy, the suckers can be planted out direct into their permanent positions if required.

nwatta Prefers a good deep loam and a semi-shady position[1, 134]. Requires a sheltered position[1]. Plants are hardier when grown in poorer soils[200]. The young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

5.2.94 Bunium bulbocastanum

Pig Nut, Earth-nut

4 tin 8 cyuc 4 kcaak 0 tcan 1 dwat 0.6 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyixre7t hjonli

drutta Bunium bulbocastanum is a PERENNIAL growing to 0.6 m (2ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to July, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers moist soil.

ksacta Edible Parts: Leaves RootEdible Uses: CondimentRoot - raw or cooked[46, 61, 115]. A delicious taste very much like sweet chestnuts when cooked[2, K], but the tubers are very small and fiddly to harvest[183]. Seed and tubers. Used as a flavouring[61, 183], they are a cumin substitute[46]. Leaves - raw or cooked. They are used as a garnish and a flavouring in much the same way as parsley[46, 61, 183].

dwatta AstringentAstringent[61].

nrakta Western and Southern Europe, including Britain, from the Netherlands to Italy. ksacta Rough grassland and banks on chalk[17].

propta Seed - sow spring in a cold frame. The seedlings only have one cotyledon[17]. Germination is usually free and quick, prick out the seedlings into individual pots as soon as they are large enough to handle and grow on for their first season in pots. Plant them out into their final positions when dormant in the autumn. The seed can also be sown in situ, but this is best done only if you have lots of seed since far fewer plants will result. Division in spring or autumn.

nwatta See the plants native habitat for ideas on its cultivation needs. The pig nut has at times been cultivated for its edible root[61]. Although quite small in the wild, there is a potential to improve the size of this root through selective breeding and cultivation. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is tuberous with swollen potato-like roots [1-2].

nwatta Succeeds in most soils and in climates ranging from sub-arctic to sub-tropical[1, 171]. Easily grown in light soils[162]. Widely cultivated in temperate zones, especially in cooler or moister areas, for its edible seed[1, 50, 171]. There are many named varieties. This species is sometimes considered to be no more than a sub-species of *H. vulgare*[61].

5.2.90 Hemerocallis exaltata

4 tlin 8 cyuc 4 kcaok 0 tcan 1 dwat 1 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyikfrp hpa7tli flat-prikliwis hpa7tmwatli xre7t hjonli

drutta Hemerocallis exaltata is a PERENNIAL growing to 1 m (3ft 3in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from June to July. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Large quantities of the leaves are said to be hallucinogenic. Blanching the leaves removes this hallucinatory component[205]. (This report does not make clear what it means by blanching, it could be excluding light from the growing shoots or immersing in boiling water[K].)

kcakta Edible Parts: Flowers LeavesEdible Uses: Leaves and young shoots - cooked[116, 205]. They must be consumed when very young or else they become fibrous[K]. Flowers and flower buds - raw or cooked[105, 177]. They can be dried and used as a thickener in soups etc. The flower buds contain about 43mg vitamin C per 100g, 983 IU vitamin A and 3.1% protein[205].

tcanta WeavingThe tough dried foliage is plaited into cord and used for making footwear[205].

dwatta Antidote Diuretic Vitamin CThe juice of the roots is an effective antidote in cases of arsenic poisoning[205]. A tea made from the boiled roots is used as a diuretic[205].

nrakta E. Asia - Japan, it is only found on Tobishima Island, a small islet off W. Japan. ksacta Meadows[187].

propta Seed - sow in the middle of spring in a greenhouse. Germination is usually fairly rapid and good. Prick out the seedlings into individual pots when they are large enough to handle. Grow the plants on for their first winter in a greenhouse and plant out in late spring[K]. Division in spring or after flowering in late summer or autumn[200]. Division is very quick and easy, succeeding at almost any time of the year[K]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Succeeds in most soils[1], including dry ones, preferring a rich moist soil[200, 205]. Grows well in heavy clay soils. Succeeding in sun or shade, it produces more flowers in a sunny position though these flowers can be shorter-lived in very sunny positions[205]. Succeeds in short grass if the soil is moist[1]. Prefers a pH between 6 and 7[200]. This species is hardy to about -15°C[187]. Hybridizes freely with other members of this genus[200]. Some roots are short and enlarged, others long with spindle-shaped tuberous ends. The plant forms a compact clump[233], but it also produces rhizomes that tend to spread[205]. Individual flowers are very short-lived, they open in the morning and wither in the evening[205]. Plants take a year or two to become established after being moved[200]. Plants seem to be immune to the predations of rabbits[233]. The plants are very susceptible to slug and snail damage, the young growth in spring is especially at risk[200].

5.2.91 Hemerocallis fulva longituba

4 tlin 8 cyuc 4 kcaok 2 tcan 1 dwat 1 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyikfrp hpa7tli flat-prikliwis hpa7tmwatli xre7t hjonli

drutta Hemerocallis fulva longituba is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from June to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium

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

pcista Large quantities of the leaves are said to be hallucinogenic[127, 137]. Blanching the leaves removes this hallucinatory component[205]. (This report does not make clear what it means by blanching, it could be excluding light from the growing shoots or immersing in boiling water[K].)

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Leaves and young shoots - cooked[105, 116]. They must be consumed when very young or else they become fibrous[K]. Flowers and flower buds - raw or cooked[105, 177]. They can be dried and used as a thickener in soups etc. The flower buds contain about 43mg vitamin C per 100g, 983 IU vitamin A and 3.1% protein[205]. Root - raw or cooked[205]. A pleasant nutty flavour.

tcanta WeavingThe tough dried foliage is plaited into cord and used for making footwear[205].

dwatta Antidote Diuretic Vitamin CThe juice of the roots is an effective antidote in cases of arsenic poisoning[205]. A tea made from the boiled roots is used as a diuretic[205].

nrakta E. Asia - C. and S. Japan ksacta Long cultivated, the plant is not known in the wild

propta Seed - sow in the middle of spring in a greenhouse. Germination is usually fairly rapid and good. Prick out the seedlings into individual pots when they are large enough to handle. Grow the plants on for their first winter in a greenhouse and plant out in late spring[K]. Division in spring or after flowering in late summer or autumn[200]. Division is very quick and easy, succeeding at almost any time of the year[K]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Succeeds in most soils[1], including dry ones, preferring a rich moist soil and a sunny position[200] but tolerating partial shade. Plants flower less freely in a shady position though the flowers can last longer in such a position[205]. Grows well in heavy clay soils. Succeeds in short grass if the soil is moist[1]. Prefers a pH between 6 and 7[200]. Hybridizes freely with other members of this genus[200]. Unlike the type species, this form does produce viable seed[187]. Plants take a year or two to become established after being moved[200]. Individual flowers are short-lived, opening in the morning and withering in the evening. The plant, however, produces a succession of flowers over a period of about 6 weeks[205]. Plants seem to be immune to the predations of rabbits[233]. The plants are very susceptible to slug and snail damage, the young growth in spring is especially at risk[200].

5.2.92 Hemerocallis thunbergii

4 tlin 8 cyuc 4 kcaok 2 tcan 1 dwat 0.5 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyikfrp hpa7tli flat-prikliwis hpa7tmwatli xre7t hjonli

drutta Hemerocallis thunbergii is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Large quantities of the leaves are said to be hallucinogenic. Blanching the leaves removes this hallucinatory component[205]. (This report does not make clear what it means by blanching, it could be excluding light from the growing shoots or immersing in boiling water[K].)

kcakta Edible Parts: Flowers LeavesEdible Uses: Leaves and young shoots - cooked[205]. They must be consumed when very young or else they become fibrous[K]. Flowers and flower buds - raw or cooked[105, 177]. The flowers can be dried and used as a thickener in soups etc. The flower buds contain about 43mg vitamin C per 100g, 983 IU vitamin A and 3.1% protein[205].

tcanta WeavingThe tough dried foliage is plaited into cord and used for making footwear[205]. Attractive Flowers.

can hang on the bush until early autumn[K]. The fruit can also be dried for winter use[183]. The fruit is about 10mm in diameter, though it is larger in some selected cultivars[200]. Flowers - raw. A sweet taste[85]. The leaves can be used to make a tea or as a flavouring in foods[183].

dwatta Antidote poultice of the plant has been applied to snakebites[257].

nrakta Central N. America - Saskatchewan and Minnesota, west to the Rockies and south to Texas. ksacta Rocky bluffs and slopes, also along the sides of streams[235].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. Stored seed requires 3 months cold stratification at between 0 and 5°C and should be sown as early in the year as possible[113, 164]. Under normal storage conditions the seed can remain viable for 17 years or more. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter, planting them out in late spring of the following year. Cuttings of half-ripe wood, 10 - 15cm with a heel, July/August in a frame[78, 113]. Cuttings of mature wood of the current year's growth, preferably with a heel of the previous year's growth, November to February in a cold frame or sheltered bed outdoors[78, 200]. Division of suckers in the dormant season. They can be planted out direct into their permanent positions.

nwatta Easily grown in a moisture retentive but well-drained loamy soil of at least moderate quality[11, 200]. Prefers full sun but it is quite tolerant of shade though it does not fruit so well in such a position[11]. Hardy to about -25°C[184]. A very ornamental plant[1]. The flowers are deliciously clove-scented[245]. This species is closely allied to *R. aureum*[11, 200]. Occasionally cultivated for its edible fruit, there are some named varieties[183]. The period of fruit ripening is unusually long[183]. The cultivar 'Crandall' has large edible fruits with a tart-sweet flavour that are high in pectin[200]. This species succeeds in regions having hot summers[183]. The fruits can be red, black, yellow, golden or reddish-brown[164]. Plants often produce suckers, especially when growing in damp soils. Plants can harbour a stage of white pine blister rust, so should not be grown in the vicinity of pine trees[155]. Plants in this genus are notably susceptible to honey fungus[200]. The plant is heat tolerant in zones 8 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2]. The root pattern is a heart root, dividing from the crown into several primary roots going down and out [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

nwatta Succeeds in most soils in sun or semi-shade[200]. Hardy to about -20°C[200]. A polymorphic species, varying in both leaf shape and growth habit[43, 270]. The flowers are malodorous[200], they smell like dead rats[207]. A vigorous plant, it can be grown through trees or shrubs or over tree stumps[200]. The sub-species *S. herbacea nipponicum* is used in Japan[61]. This report probably refers to the species *S. nipponical*[K]. Dioecious. Male and female plants must be grown if seed is required. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. Growth habit is a single or multiple shooting vine from a crown [1-2]. Herbaceous.

5.2.69 Smilax herbacea

Carrion Flower, Smooth carrionflower
4 tlin 8 cyuc 4 kcaok 2 tcan 1 dwat 2.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli nyanhjen hjonli

drutta Smilax herbacea is a PERENNIAL CLIMBER growing to 2.5 m (8ft 2in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from May to June. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). . The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit Leaves RootEdible Uses: GelatineLeaves and young shoots - raw or cooked and used

like asparagus[85, 102, 159]. A delicate and palatable vegetable[183]. Fruit - raw or cooked and used in jellies etc[85, 183]. It should only be used when fully ripe[183]. A pleasant flavour[207, 257]. The fruit is about 10mm in diameter[200]. Root - cooked[257]. It can be dried, ground into a powder and then used with cereals for making bread etc[62, 102]. It can also be used as a gelatine substitute[62, 102].

dwatta Analgesic Antiaphonic Kidney Pectoral Poulitce SalveEating the fruit is said to be effective in treating hoarseness[207, 257]. The parched and powdered leaves have been used as a dressing on burns[257]. The wilted leaves have been used as a dressing on boils[257]. The root is analgesic[257]. A decoction has been used in the treatment of back pains, stomach complaints, lung disorders and kidney problems[257].

nrakta Eastern N. America - southwards from Quebec. ksacta Open woodlands, meadows and rich alluvial thickets[43]. Higher elevations in rich woods, alluvial thickets, and meadows, often in calcareous soils at elevations of 100-800 metres[270].

propta Seed - sow March in a warm greenhouse[1]. This note probably refers to the tropical members of the genus, seeds of plants from cooler areas seem to require a period of cold stratification, some species taking 2 or more years to germinate[K]. We sow the seed of temperate species in a cold frame as soon as we receive it, and would sow the seed as soon as it is ripe if we could obtain it then[K]. When the seedlings eventually germinate, prick them out into individual pots when they are large enough to handle and grow them on in the greenhouse for at least their first year, though we normally grow them on in pots for 2 years. Plant them out into their permanent positions in early summer. Division in early spring as new growth begins[238]. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer. Cuttings of half-ripe shoots, July in a frame[238].

nwatta Succeeds in most soils in sun or semi-shade[200]. Hardy to about -20°C[200]. A polymorphic species, varying in both leaf shape and growth habit[43, 270]. The flowers are malodorous[200], they smell like dead rats[207]. A vigorous plant, it can be grown through trees or shrubs or over tree stumps[200]. The sub-species *S. herbacea nipponicum* is used in Japan[61]. This report probably refers to the species *S. nipponical*[K]. Dioecious. Male and female plants must be grown if seed is required. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. Growth habit is a single or multiple shooting vine from a crown [1-2]. Herbaceous.

5.2.70 Rhus copallina

Dwarf Sumach, Winged sumac, Flameleaf Sumac, Winged Sumac, Shining Sumac

4 tlin 10 cyuc 4 kcaok 3 tcan 2 dwat 2 m hkuc htut cyutli hgatkyuctcup hwicli hychshrasjlutnyik hpa7tli flat-prikliwis hpa7tmwatli nyanhjen hjonli

drutta Rhus copallina is a deciduous Shrub growing to 2 m (6ft) by 2 m (6ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from July to September, and the seeds ripen from October to December. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure.

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

kcakta Edible Parts: Fruit OilEdible Uses: Drink Oil-Fruit - raw or cooked[22, 46, 161]. An agreeable acid

flavour[2]. The fruit is only 3 - 5mm long with very little flesh, but it is borne on dense panicles and is thus easily harvested[229]. When soaked for 10 - 30 minutes in hot or cold water it makes a very refreshing lemonade-like drink (without any fizz of course)[95, 105, 149, 159, 183]. The mixture should not be boiled since this will release tannic acids and make the drink astringent.

tcanta Dye Hedge Hedge Mordant Oil Resin Soil stabilization Tannin Varnish WoodThe leaves are rich in tannin[46, 82, 169], so is the bark[149] and the fruit[169]. The leaves can be collected as they fall in the autumn and used as a brown dye or as a mordant[169, 171]. The leaves contain 10 - 25% tannin[171]. Up to 35.8% has been obtained from some plants[223]. An oil is extracted from the seeds[4]. It attains a tallow-like consistency on standing and is used to make candles. These burn brilliantly, though they emit a pungent smoke[4]. The plants extensive root system makes it useful for stabilizing soils. A black dye is obtained from the fruit[149, 257]. A resin, 'copal resin', is obtained from the sap of this plant. When dissolved in any volatile liquid, such as oil of turpentine, it makes a beautiful varnish[4]. (Is this a mistaken entry? Perhaps it belongs with one of the toxic species[K]). Wood - light, soft, coarse grained[82]. It weighs 32lb per cubic foot[227]. Sometimes used for small posts[149].

dwatta Astringent Dysentery Euresis Galactogogue Poultice SalveA decoction of the root has been used in the treatment of dysentery[222]. An infusion of the roots has been used in the treatment of VD[257]. A poultice of the root has been applied to sores and skin eruptions[257]. A tea made from the bark has been drunk to stimulate milk flow in nursing mothers. A decoction of the bark has been used as a wash for blisters and sunburn blisters[222, 257]. An infusion of the leaves has been used to cleanse and purify skin eruptions[257]. The berries were chewed in the treatment of bed-wetting and mouth sores[222, 257]. Some caution is advised in the use of the leaves and stems of this plant, see the notes above on toxicity.

nrakta Eastern N. America - Maine to Florida, west to Texas and Illinois. ksacta Generally found in dry soils on hillsides, along the margins of woodlands and roads, and in abandoned fields[229].

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

nwatta Experimental Crop Industrial Crop: Dye Industrial Crop: Hydrocarbon Industrial Crop: Tannin Management: CoppiceLandscape Uses:Border, Erosion control, Pest tolerant, Massing, Specimen. Succeeds in a well-drained fertile soil in full sun[11, 200]. Tolerates poor soils[169, 200]. Established plants are drought resistant[169]. A very hardy species, when fully dormant it can tolerate temperatures down to about -25°C[200]. However, the young growth in spring can be damaged by late frosts. A very ornamental plant[1]. It is quite fast-growing but short-lived in the wild[229]. In the north of its range plants are dwarf, around 1.2 metres tall, but in the south they can be up to 7 metres tall[182]. Some botanists divide this species into separate species, whilst others see it as a single species with geographical forms. R. copallina is usually a shrub and is found in moist soils in sun or shade[227]. R. copallina lanceolata. Gray is more tree-like and is found in drier soils[227]. Transplants easily[169]. Plants have brittle branches and these can be broken off in strong winds[200]. Plants are also susceptible to coral spot fungus[11]. Many of the species in this genus are highly toxic and can also cause severe irritation to the skin of some people, whilst other species such as this one are not poisonous. It is relatively simple to distinguish which is which, the poisonous species have axillary panicles and smooth fruits whilst non-poisonous species

have compound terminal panicles and fruits covered with acid crimson hairs[1, 4]. The toxic species are sometimes separated into their own genus, Toxicodendron, by some botanists[200]. Plants in this genus are notably resistant to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required. Special Features:Attracts birds, North American native, Attracts butterflies, Attractive flowers or blooms. Carbon Farming - Cultivation: experimental. Management: coppice. The plant is heat tolerant in zones 9 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a running thicket former forming a colony from shoots away from the crown spreading indefinitely [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

5.2.71 Helianthus tuberosus

Jerusalem Artichoke

4 tin 8 cyuc 4 kcaak 3 tcan 1 dwat 2.4 m hkuc htuc cyutli kyuctup hwicli hysihrasjltunyk hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Helianthus tuberosus is a PERENNIAL growing to 2.4 m (7ft) by 0.6 m (2ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in October, and the seeds ripen in November. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate strong winds but not maritime exposure.

kcakta Edible Parts: RootEdible Uses: Coffee SweetenerTubers - raw or cooked[2, 46, 61, 95]. The tuber develops a pleasant sweetness during the winter, especially if subjected to frosts, and is then reasonably acceptable raw[K]. Otherwise it is generally best cooked, and can be used in all the ways that potatoes are used[K]. The tubers are rich in inulin[46], a starch which the body cannot digest, so Jerusalem artichokes provide a bulk of food without many calories[K]. Some people are not very tolerant of inulin, it tends to ferment in their guts and can cause quite severe wind[K]. The tubers are fairly large, up to 10cm long and 6cm in diameter[200]. The tubers bruise easily and lose moisture rapidly so are best left in the ground and harvested as required[200]. The inulin from the roots can be converted into fructose, a sweet substance that is safe for diabetics to use[46, 171]. The roasted tubers are a coffee substitute[183].

tcanta BiomassThe plants are a good source of biomass. The tubers are used in industry to make alcohol etc[141]. The alcohol fermented from the tubers is said to be of better quality than that from sugar beets[269]. A fast-growing plant, Jerusalem artichokes can be grown as a temporary summer screen[200]. Very temporary, it is July before they reach a reasonable height and by October they are dying down[K].

dwatta Aperient Cholagogue Diuretic Stomachic TonicReported to be aperient, aphrodisiac, cholagogue, diuretic, spermatogenic, stomachic, and tonic, Jerusalem artichoke is a folk remedy for diabetes and rheumatism[269].

nrakta Eastern N. America - Nova Scotia to Minnesota and Kansas. Occasionally naturalized in Britain. ksacta Rich and damp thickets[43].

propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring or autumn[200]. Harvest the tubers in late

nwatta Prefers a good deep loam and a semi-shady position[1, 134]. Requires a sheltered position[1]. Plants are harder when grown in poorer soils[200]. Tolerates a pH in the range 5.0 to 7.4. Dormant plants are hardy to about -25°C[187]. The young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. This is a commonly cultivated food crop in Japan, where it is grown for its edible shoots. There are several named varieties[2, 46, 58, 116]. The plant is heat tolerant in zones 9 through 6. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2].

5.2.88 Amaranthus blitum

Slender Amaranth, Purple amaranth

4 tin 8 cyuc 4 kcaak 2 tcan 2 dwat 1 m hkuc htuc cyutli tcup hwicli hrasjltunyk hpa7tli frusflatprikliwis hpa7tmwatli fyf hjonli

drutta Amaranthus blitum is a ANNUAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf from April to October, in flower in August, and the seeds ripen in September. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It cannot grow in the shade. It prefers moist soil.

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

kcakta Edible Parts: Leaves SeedEdible Uses: ColouringLeaves - raw or cooked as a spinach[2, 4, 55, 183]. The leaves contain about 3.88% protein, 1.1% fat, 9.38% carbohydrate, 3.2% ash, 323mg Ca, 8.3mg Fe, they are very rich in Vitamins A and C, rich in vitamin B1[179]. The leaves are used as a potherb in order to remove poison from the system[218]. Seed - cooked. Used as a cereal substitute in cakes, porridge etc[55, 183]. Very small, about 1.2mm in diameter[266], but it is easy to harvest and very nutritious. The seed can be cooked whole, and becomes very gelatinous like this, but it is rather difficult to crush all of the small seeds in the mouth and thus some of the seed will pass right through the digestive system without being assimilated[K]. An edible dye is obtained from the seed capsules[4].

tcanta DyeYellow and green dyes can be obtained from the whole plant[168].

dwatta AstringentA fluid extract of the plant is used as an astringent internally in the treatment of ulcerated mouths and throats, externally as a wash for ulcers and sores[4]. The juice of the roots is used externally to relieve headaches[272]. The plant has a folk reputation for being effective in the treatment of tumours and warts[218].

nrakta Temperate and Tropical zones. ksacta A cosmopolitan weed growing on waste ground[58, 204].

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

nwatta Often cultivated, especially the form oleraceus, the plant succeeds from the temperate zone through to the

tropics. It grows best in areas where annual daytime temperatures are within the range 21 - 27°C, but can tolerate 18 - 32°C[418]. It can be killed by temperatures of 4°C or lower[418]. It prefers a mean annual rainfall in the range 1,200 - 1,500mm, but tolerates 200 - 2,700mm[418]. Prefers a well-drained fertile soil in a sunny position[200]. Requires a hot sheltered position if it is to do well[K]. Prefers a pH in the range 5.5 - 7, tolerating 4.3 to 7.5[418]. The plant has become a weed in many areas of the world outside its original range. It is classified as 'Invasive' in many Pacific Islands[305]. Plants are particularly susceptible to attacks by leaf-chewing insects[298]. Plants should not be given inorganic fertilizers, see notes above on toxicity. This plant was cultivated by the ancient Romans and Greeks for its edible leaves, there are some named varieties[183]. Most if not all members of this genus photosynthesize by a more efficient method than most plants. Called the 'C4 carbon-fixation pathway', this process is particularly efficient at high temperatures, in bright sunlight and under dry conditions[196]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is clumping, giving the plant a clumping habit. The predictable growth behaviour makes it easier to maintain without having to apply containment methods[2-1].

5.2.89 Hordeum distichon

Two-Rowed Barley

4 tin 8 cyuc 4 kcaak 0 tcan 3 dwat 1.2 m hkuc htuc cyutli tcup hwicli hrasjltunyk hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Hordeum distichon is a ANNUAL growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: SeedEdible Uses: Coffee Salt SweetenerSeed - cooked. The seed can be ground into a flour and used as a cereal in making bread, porridge etc[1, 4, 34, 46]. Malt is obtained by sprouting and roasting the seed, then boiling the seed. The resulting liquid is a sweet substance that is used in making beer and as a food[4, 46]. The longer the seed is roasted, the darker this liquid will be. The roasted (unsprouted) seed is used as a coffee and a salt substitute[46].

tcanta Biomass Mulch PaperThe stems, after the seed has been harvested, have many uses. They are a source of fibres for making paper, a biomass for fuel etc, they can be shredded and used as a mulch[141, 171].

dwatta Antidiarrhoeal Demulcent Nutritive UrinaryBarley grain is an excellent food for convalescence, either in the form of porridge or as a decoction of the seed. It is soothing to the throat and provides easily assimilated nutrients[4, 254]. It can also be taken to clear catarrh. Its demulcent properties soothes inflammation of the gut and urinary tract[254]. It is commonly given to children suffering minor infections or diarrhoea and is particularly recommended as a treatment for feverish states and in catarrhal affections of the respiratory and urinary organs[4, 254]. Made into a poultice, the seed is an effective remedy for soothing and reducing inflammation in sores and swellings[254]. Modern research has shown that barley may be of aid in the treatment of hepatitis, whilst other trials have shown that it may help to control diabetes[254]. Barley bran may have the effect of lowering blood cholesterol levels and preventing bowel cancer[254].

nrakta Of uncertain origin, possibly a hybrid between H. spontaneum and a 6-rowed barley[34]. ksacta Not known in the wild. Occurs as a relic of cultivation in Britain but it does not persist[17].

propta Seed - sow in situ in March or October and only just cover the seed. Make sure the soil surface does not dry out if the weather is dry. Germination takes place within 2 weeks.

betacyanin and anthocyanin are important in the exchange of substances of cancer cells; others note two main components of the amines, choline and its oxidation product betaine, whose absence produces tumours in mice[269]. The juice has been applied to ulcers[269]. A decoction is used as a purgative by those who suffer from haemorrhoids in South Africa[269]. Leaves and roots used as an emmenagogue[269]. Plant effective in the treatment of feline ascariasis[269]. In the old days, beet juice was recommended as a remedy for anaemia and yellow jaundice, and, put into the nostrils to purge the head, clear ringing ears, and alleviate toothache[269]. Beet juice in vinegar was said to rid the scalp of dandruff as scurf, and was recommended to prevent falling hair[269]. Juice of the white beet was said to clear obstructions of the liver and spleen[269]. Culpeper (1653) recommended it for treating headache and vertigo as well as all affections of the brain[269].

nrakta A cultivated form of *B. vulgaris maritima* that is grown for the sugar content of its root. ksacta Not known in a truly wild situation.

propta Seed - sow April in situ.

nwatta Beets grow well in a variety of soils, growing best in a deep, friable well-drained soil abundant with organic matter, but doing poorly on clay. They prefer an open position and a light well-drained soil[52]. The optimum pH is 6.0 - 6.8, but neutral and alkaline soils are tolerated in some areas. Some salinity may be tolerated after the seedling stage. Beets are notable for their tolerance to manganese toxicity. Beet is reported to tolerate an annual precipitation of 23 to 315cm, an average annual temperature range of 5.0 to 26.6°C and a pH of 4.2 to 8.2[269]. Sugar beet is widely cultivated as a commercial sugar crop in temperate climates. About one third of all sugar production in the world is derived from this plant[269]. It is not usually grown on a garden scale. There are several named varieties[46].

5.2.86 Ribes rubrum

Red Currant, Cultivated currant

4 tlin 8 cyuc 4 kcaak 2 tcan 1 dwat 1.2 m hkuc hmimhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikliws hpa7tmwatli fyifxre7t hjonli

drutta *Ribes rubrum* is a deciduous Shrub growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to May, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The fresh leaves contain the toxin hydrogen cyanide, though details of quantities are not given[240]. This substance is found in several foods, including almonds. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

ksakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[1, 2, 5, 11]. A pleasant acid flavour, it can be eaten out of hand but is more often cooked in pies, jams etc[K]. There are rather a lot of seeds in each fruit[K].

tcanta Cosmetic DyeA yellow dye is obtained from the leaves[100]. A black dye is obtained from the fruit[100]. The fruit is used cosmetically in face-masks for firming up tired and lifeless skin[7].

dwatta Antirheumatic Antiscorbutic Aperient Poultrice Refrigerant SialagogueThe fruit is antiscorbutic, aperient, depurative, digestive, diuretic, laxative, refrigerant and sialagogue[4, 7, 21]. The leaves contain the toxin hydrogen cyanide[240]. A concoction of them is used externally to relieve rheumatic symptoms[7]. They are also used in poultices to relieve sprains or reduce the pain of dislocations[7].

nrakta Western Europe, including Britain. ksacta Damp soils in hedges and woods, avoiding acid soils[7, 9, 17].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. Stored seed requires 3 months cold stratification at between 0 and 5°c and should be sown as early in the year as possible[113, 164]. Under normal storage conditions the seed can remain viable for 17 years or

more. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter, planting them out in late spring of the following year. Cuttings of half-ripe wood, 10 - 15cm with a heel, July/August in a frame[78, 113]. Cuttings of mature wood of the current year's growth, preferably with a heel of the previous year's growth, November to February in a cold frame or sheltered bed outdoors[78, 200].

nwatta Easily grown in a moisture retentive but well-drained loamy soil of at least moderate quality[11, 200]. Plants are quite tolerant of shade, even succeeding on a north-facing wall[200], though they do not fruit so well in such a position[11]. Prefers a pH in the range 5.5 to 6[200]. Hardy to about -20°C[200]. Red currants are often cultivated in temperate zones for their edible fruit, there are some named varieties, including forms with white fruits[4, 61]. Most cultivars are self-fertile and set a good crop on their own[200]. The fruit is produced at the base of one-year old and older wood, plants start to fruit at 3 - 4 years from seed[200]. This is an aggregate species comprising *R. spicatum* and *R. rubrum*. There is some confusion in nomenclature with some botanists only recognising 2 species, *R. silvestre*. (syn *R. sativum*) and *R. spicatum* (syn *R. rubrum*)[17, 200]. Plants can harbour a stage of white pine blister rust, so should not be grown in the vicinity of pine trees[155]. Plants in this genus are notably susceptible to honey fungus[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2].

5.2.87 Aralia cordata

Udo

4 tlin 9 cyuc 4 kcaak 0 tcan 2 dwat 1.8 m hkuc pcmhmim cyutli tcup hwicli hyishrasljutnyik hpa7tli flatprikliws hpa7tmwatli xre7t hjonli

drutta *Aralia cordata* is a PERENNIAL growing to 1.8 m (6ft). See above for USDA hardiness. It is hardy to UK zone 5 and is frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

ksakta Edible Parts: Leaves Root Shoots StemEdible Uses: Young branched shoots - cooked or raw[2, 46, 61, 105, 177, 279]. They can be up to 1.5 metres long and have a mild and agreeable flavour[116]. They are usually blanched and are crisp and tender with a unique lemon-like flavour[183]. They can be sliced and added to salads, soups etc[206]. The shoots contain about 1.1% protein, 0.42% fat, 0.8% soluble carbohydrate, 0.55% ash[179]. Root - cooked[22, 105, 177]. Used like scorzonera[2].

dwatta Analgesic Antiinflammatory Carminative Diuretic Febrifuge Stimulant Stomachic TonicThe root is sometimes used in China as a substitute for ginseng (Panax species)[218]. It is said to be analgesic, antiinflammatory, carminative, diuretic, febrifuge, stimulant, stomachic and tonic[218, 279]. The root contains an essential oil, saponins, sesquiterpenes and diterpene acids[279]. It is used in Korea to treat the common cold and migraines[279].

nrakta E. Asia - China, Japan, Korea. ksacta Thickets and thin woods, esp. by streams and ravines, all over Japan[58, 275].

propta Seed - best sown as soon as ripe in a cold frame. Stored seed requires 3 - 5 months of cold stratification. Germination usually takes place within 1 - 4 months at 20°C[134]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in a greenhouse for at least their first winter. Once the plants are 25cm or more tall, they can be planted out into their permanent positions, late spring or early summer being the best time to do this. Root cuttings 8cm long, December in a cold frame[11, 78]. Store the roots upside down in sand and pot up in March/April. High percentage[78]. Division of suckers in late winter[11]. Very easy, the suckers can be planted out direct into their permanent positions if required.

autumn or the winter and either replant the tubers immediately or store them in a cool but frost-free place and plant them out in early spring. Jerusalem artichoke is propagated by tubers, which should be planted as early as possible in the spring when the soil can be satisfactorily worked[269]. Late planting usually reduces tuber yields and size seriously. Whole tubers or pieces about 50 g (2 oz.) should be planted like potatoes and covered to a depth of 10 cm. Pieces larger than 50 g do not increase the yield, though those smaller will decrease it. Deeper planting may delay emergence, weaken the sprouts, and cause the tubers to develop deeper, making harvest more difficult[269]. Basal cuttings in spring. Harvest the shoots when they are about 10 - 15cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Management: Standard Staple Crop: Protein-oilA very easily grown plant, it grows best in a loose circumneutral loam but succeeds in most soils and conditions in a sunny position[1, 16, 37, 38, 269]. Plants are more productive when grown in a rich soil[1, 37, 38]. Heavy soils produce the highest yields, but the tubers are easily damaged at harvest-time so lighter well-drained sandy loams are more suitable[200]. Dislikes shade[1]. Likes some lime in the soil[16]. Jerusalem artichoke is reported to tolerate an annual precipitation of 31 to 282cm, an average annual temperature of 6.3 to 26.6°C and a pH in the range of 4.5 to 8.2[269]. Jerusalem artichokes were cultivated as a food plant by the N. American Indians and they are today often grown in temperate areas for their edible tubers. There are some named varieties[4, 46, 183, 200]. The plant is a suitable crop in any soil and climate where corn (*Zea mays*) will grow. It survives in poor soil and in areas as cold as Alaska. It also tolerates hot to sub-zero temperatures[269]. The first frost kills the stems and leaves, but the tubers can withstand freezing for months[269]. The plants are particularly suited to dry regions and poor soils where they will out-yield potatoes[200]. Tuber production occurs in response to decreasing day-length in late summer[200]. Yields range from 1 - 2kg per square metre[200]. The tubers are very cold-tolerant and can be safely left in the ground in the winter to be harvested as required. They can be attacked by slugs, however, and in sites prone to slug damage it is probably best to harvest the tubers in late autumn and store them over the winter. It is almost impossible to find all the tubers at harvest time, any left in the soil will grow away vigorously in the spring. Plants do not flower in northern Europe. They are sensitive to day-length hours, requiring longer periods of light from seedling to maturation of plant, and shorter periods for tuber formation. They do not grow where day-lengths vary little[269]. The plant is good weed eradicator, it makes so dense a shade that few other plants can compete[269]. The young growth is extremely attractive to slugs, plants can be totally destroyed by them[K]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Plants only produce flowers in Britain after a long hot summer[17] and seed is rarely formed[200]. Grows well with corn[20]. Plants can be invasive[1]. The plant is heat tolerant in zones 9 through 7. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is tuberous with swollen potato-like roots [1-2].

5.2.72 Amaranthus caudatus

Love Lies Bleeding

4 tlin 8 cyuc 4 kcaak 2 tcan 1 dwat 2 m hkuc htut cyutli hgatkycutcup hwicli hyishrasljutnyik hpa7tli frusflatprikliwssliphsom hpa7tmwatli fyif hjonli

drutta *Amaranthus caudatus* is a ANNUAL growing to 2 m (6ft) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from July to September, and the seeds ripen from August to September. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid, very alkaline and saline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

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

ksakta Edible Parts: Leaves SeedEdible Uses: ColouringLeaves - raw or cooked as a spinach or added to soups etc[22, 46, 61, 105, 183]. The mild flavoured leaves are rich in vitamins and minerals[183, K]. Seed - cooked[22, 46, 57, 105]. Very small but easy to harvest and very nutritious, individual plants can bear up to 100, 000 seeds[196]. It is eaten cooked or ground into a powder and used in baking[61, 183, 196]. The seed can also be popped in much the same way as popcorn[97, 183]. The seed can be cooked whole, and becomes very gelatinous like this, but it is rather difficult to crush all of the small seeds in the mouth and thus some of the seed will pass right through the digestive system without being assimilated[K]. The seed is very nutritious and contains 13 - 18% of a very high quality protein that is rich in the amino acid lysine[196]. It also contains good quantities of calcium, phosphorus, iron, potassium, zinc, vitamin E and the vitamin B complex[196]. A red food colouring called 'betalaina' is obtained from red cultivars[196].

tcanta DyeYellow and green dyes can be obtained from the whole plant[168].

dwatta Anthelmintic AstringentThe plant is astringent, anthelmintic and diuretic[4, 240]. It is used in the treatment of stranguary and is applied externally to scrofulous sores[240].

nrakta Tropics. ksacta A weed of cultivated ground[145].

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

nwatta Prefers a well-drained fertile soil in a sunny position[196, 200]. Grows moderately well in poor soils[200]. Requires a hot sheltered position if it is to do well[K]. Plants are drought resistant though reasonable moisture levels are required for germination and also at pollination[196]. Some forms can tolerate a pH up to 8.5, there are also some that can tolerate mild salinity[196]. It is likely that they will also tolerate acid soils and aluminium toxicity[196]. Plants are not frost-hardy, the most cold tolerant cultivars can tolerate temperatures down to about 4°C[196]. Plants should not be given inorganic fertilizers, see notes above on toxicity. This species is cultivated for its edible seed and leaves in the Andes and various other parts of S. America[46, 61, 97]. It probably arose through cultivation from *A. quitensis*. There are some named varieties[196]. Plants take 4 - 6 months from sowing to harvesting the seed, but up to 10 months in some Andean highland regions[196]. Yields from 1 - 3 tonnes per hectare are common, 5 tonnes has been achieved and research sites have produced the equivalent of 6 tonnes per hectare[196]. The seed is usually harvested just before maturity otherwise some of the seed will be lost during harvesting[196]. Plants usually have downward facing seedheads but varieties have been developed with upward facing heads that can be harvested mechanically[196]. This species is sensitive to day-length most cultivars are short-day and have not done well in northern latitudes, but there are some varieties that flower at day-lengths up to 16 hours[196]. Most if not all members of this genus photosynthesize by a more efficient method than most plants. Called the 'C4 carbon-fixation pathway', this process is particularly efficient at high temper-

peratures, in bright sunlight and under dry conditions[196]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is clumping, giving the plant a clumping habit. The predictable growth behaviour makes it easier to maintain without having to apply containment methods[2-1].

5.2.73 Berberis buxifolia

Magellan Barberry

4 tin 8 cyuc 4 kcaak 3 tcan 2 dwat 2.5 m hkuc
hmmihhut cyutli kyuctup hwicli hyishrasjlutnykfrip hpa7tli flatprikklwis hpa7tmwatli fyifxre7t hjonli

drutta Berberis buxifolia is an evergreen Shrub growing to 2.5 m (8ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf all year, in flower in April. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or used in preserves[3, 11, 69, 139, 177]. Freely borne in Britain. Large and black with a pleasant flavour, they are eaten out of hand[183]. Said to be the best flavoured of the South American barberries, the fruit is hardly acid and but slightly astringent[2]. The green unripe fruits can be used like gooseberries in pies etc[2, 183]. The fruits are about 8mm long[200].

tcanta Dye Hedge HedgeA yellow dye is obtained from the root[139]. The dwarf form, var. 'Nana' makes a good dwarf hedge to 1 metre tall[182].

dwatta Antibacterial Cancer DysenteryBerberine, universally present in rhizomes of Berberis species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Licquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta S. America - S. Chile and S. Argentina. Occasionally naturalized in Britain[17]. ksacta Coastal scrub, forest margins, clearings and moister areas in grass[69].

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Roots in 4 - 8 weeks[113]. Pot up in spring[113]. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78].

nwatta Prefers a warm moist loamy soil and light shade but it is by no means fastidious, succeeding in thin, dry and shallow soils and in full sun[11, 200]. Grows well in heavy clay soils. Plants are hardy to about -15°C[184], but they can be deciduous in cold winters[188]. The dwarf B. buxifolia nana is the form of this species that is most commonly found growing in Britain. It is very free flowering but to date (1994) we have not seen this form bearing fruit[K]. The species is supposed to be self-fertile so it is possible that this form is sterile. Hybridizes freely with other members of this genus[1]. Plants can be pruned back quite severely and resprout well from the base[200].

5.2.74 Ribes divaricatum

Coastal Black Gooseberry. Spreading gooseberry, Parish's gooseberry, Straggly gooseberry

4 tin 8 cyuc 4 kcaak 2 tcan 1 dwat 2.7 m hkuc
hmmihhut cyutli tcup hwicli hrasjlutnyk hpa7tli flatprikklwis hpa7tmwatli xre7t hjonli

drutta Ribes divaricatum is a deciduous Shrub growing to 2.7 m (8ft 10in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in April, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit - raw or cooked[2, 3, 61, 118, 257]. Sweet and juicy[183]. A very acceptable flavour, though a bit on the acid side[K]. It is considered to be one of the finest wild N. American gooseberries[183]. The fruit is sometimes harvested before it is fully ripe and then cooked[256]. The fruit is about 10mm in diameter[200]. On the wild species the fruit can hang on the plant until the autumn (if the birds leave it alone)[K]. Young leaves and unripe fruits are used to make a sauce[183].

tcanta Miscellany Needles StringThe roots have been boiled with cedar (Juniperus spp, Thuja sp.) and wild rose (Rosa spp) roots, then pounded and woven into rope[257]. The sharp thorns have been used as probes for boils, for removing splinters and for tattooing[257].

dwatta Miscellany TB VDThe inner bark has been chewed, and the juice swallowed, as a treatment for colds and sore throats[257]. A decoction of the bark or the root has been used as an eye wash for sore eyes[257]. An infusion of the roots has been used in the treatment of sore throats, venereal disease and tuberculosis[257]. The burnt stems have been rubbed on neck sores[257].

nrakta Western N. America. ksacta Open woods, prairies and moist hillsides[60].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. Stored seed requires 4 - 5 months cold stratification at between 0 to 9°C and should be sown as early in the year as possible[113, 164]. Under normal storage conditions the seed can remain viable for 17 years or more. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter: planting them out in late spring of the following year. Cuttings of half-ripe wood, 10 - 15cm with a heel, July/August in a frame[78, 113]. Cuttings of mature wood of the current year's growth, preferably with a heel of the previous year's growth, November to February in a cold frame or sheltered bed outdoors[78, 200].

nwatta Easily grown in a moisture retentive but well-drained loamy soil of at least moderate quality[11, 200]. Requires a very sunny position if it is to do well[11]. Plants are hardy to about -20°C[200]. This species is closely allied to R. rotundifolium[11]. Immune to mildew[101], this species is a parent of many mildew resistant hybrids and is being used in breeding programmes in Europe[200]. Plants can harbour a stage of white pine blister rust, so should not be grown in the vicinity of pine trees[155]. Plants in this genus are notably susceptible to honey fungus[200]. Sometimes cultivated for its edible fruit, there is at least one named variety[183]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out. The root pattern is suckering with new plants from underground runners away from the plant [2-1].

5.2.75 Rhus trilobata

Skunk Bush, Basketbush, Squawbush, Three Leaf Sumac

4 tin 6 cyuc 4 kcaak 3 tcan 2 dwat 1.8 m hkuc
htut cyutli kyuctup hwicli hrasjlutnyk hpa7tli flatprikklwis hpa7tmwatli nyanhjen hjonli

drutta Rhus trilobata is a deciduous Shrub growing to 1.8 m (6ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower

Quite tolerant of shade though not fruiting so well in such a position[11]. Hardy to about -20°C[200]. Plants can harbour a stage of 'white pine blister rust', so they should not be grown in the vicinity of pine trees[155]. Plants in this genus are notably susceptible to honey fungus[200].

5.2.83 Astrebla squarrosa

Bull Mitchell grass

4 tin 12 cyuc 4 kcaak 1 tcan 0 dwat 1.5 m hkuc
htut cyutli hgatkyuctup hwicli hyishrasjlutnykfrip hpa7tli flatprikklwis hpa7tmwatli hjonli

drutta Astrebla squarrosa is a PERENNIAL growing to 1.5 m (5ft) by 0.1 m (0ft 4in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 10. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: Carbon Farming Solutions - Staple Crop: balanced carb (The term staple crop typically refers to a food that is eaten routinely and accounts for a dominant part of people's diets in a particular region of the world) [1-1]. Cultivated in the past but largely or completely abandoned.

tcanta Providing habitat for organisms such as mammals.

nrakta Australasia. ksacta Heavy, cracking clays on plains and river flats, sometimes with Lysiphylum or Excoecaria, or in Dicanthium-Eulalia grassland and cleared Brigalow areas; flowers after rain.

propta Wild. Seed.

nwatta Historic Crop Management: Standard Staple Crop: Balanced carbClimate: subtropical to tropical. Humidity: semi-arid. Grow on clay soils, mainly between an upper limit of 600 mm average annual rainfall, and a lower limit of 200 mm, and even below in depressions where the water concentrates following rains e.g. in Sturt's Stony Desert. Mitchell grasses are deep rooted and become dormant during drought, allowing them to survive extended periods without rainfall. Carbon Farming Solutions - Cultivation: historic crop. Cultivated in the past but largely or completely abandoned. Management: standard (Describes the non-destructive management systems that are used in cultivation) [1-1].

5.2.84 Rumex alpinus

Alpine Dock, Munk's rhubarb

4 tin 8 cyuc 4 kcaak 1 tcan 2 dwat 1.2 m hkuc
hmmihhut cyutli tcup hwicli hrasjlutnyk hpa7tli flatprikklwis hpa7tmwatli xre7t hjonli

drutta Rumex alpinus is a PERENNIAL growing to 1.2 m (4ft) by 0.3 m (1ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in July, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Plants can contain quite high levels of oxalic acid, which is what gives the leaves of many members of this genus an acid-lemon flavour. Perfectly alright in small quantities, the leaves should not be eaten in large amounts since the oxalic acid can lock-up other nutrients in the food, especially calcium, thus causing mineral deficiencies. The oxalic acid content will be reduced if the plant is cooked. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked[1, 2, 5, 21, 22, 46, 183]. They can also be dried for later use[12]. A strong flavour, the leaves can be used in salads in late autumn to the spring, but are better cooked like spinach[K]. The fresh leaves can be available for most months

of the year, only dying down for a short period in severe winters[K]. The leaves often become bitter in the summer[K]. In taste trials, this has proved to be a very popular autumn and spring cooked leaf, making an excellent spinach[K].

tcanta DyeDark green to brown and dark grey dyes can be obtained from the roots, they do not need a mordant[168]. dwatta Astringent The root is astringent and laxative[4, 9]. It has a regulatory effect on the digestive system, similar to but weaker than rhubarb (Rheum raphaniticum)[4]. It can act either as a laxative or a cure for diarrhoea according to dosage[4]. The root is harvested in early spring and dried for later use[4].

nrakta C. and S. Europe to W. Asia. Naturalized in Britain[17]. ksacta Along the banks of streams and by the sides of roads, it is also found near human habitations, in hilly areas[9].

propta Seed - sown spring in a cold frame. The seed can also be sown as soon as it is ripe when it will germinate rapidly and will provide edible leaves from early spring the following year. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring. Division is easy at almost any time of the year, though the plants establish more rapidly in the spring[K]. Use a sharp spade or knife to divide the rootstock, ensuring that there is at least one growth bud on each section of root. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta A very easily grown and tolerant plant[K], it succeeds in most soils, preferring a moist moderately fertile well-drained soil in a sunny position[200]. Hardy to about -20°C[187]. Alpine dock was at one time cultivated for its edible leaves, though it has now fallen out of favour to be replaced by less strong-tasting plants[2, 200, K]. This is a pity because it is a very productive and useful vegetable and can produce its leaves all through the winter if the weather is not too severe[K]. A very important plant for the caterpillars of many species of butterflies[30].

5.2.85 Beta vulgaris altissima

Sugar Beet

4 tin 8 cyuc 4 kcaak 0 tcan 2 dwat 1.5 m hkuc
htut cyutli tcup hwicli hrasjlutnyk hpa7tli flatprikklwis hpa7tmwatli xre7t hjonli

drutta Beta vulgaris altissima is a BIENNIAL growing to 1.5 m (5ft) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline and saline soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Leaves RootEdible Uses: SweetenerRoot - raw or cooked. The root contains 16 - 20% sugar and this is often extracted and used as a sweetener[142]. This plant is a major source of sugar in many temperate areas. The root can also be used as a vegetable. When cooked it is quite tender, but with some fibrous strands. It has a very sweet flavour that some people find too sweet[K]. The raw root is rather tough, but makes a pleasant addition to salads when grated finely[K]. Leaves - raw or cooked. A very acceptable spinach substitute[K]. Some people dislike the raw leaves since they can leave an unpleasant taste in the mouth[K].

tcanta BiomassSugar beet has excellent potential as a biomass crop, both as a source of sugar and also using the plant residue for fuel[269].

dwatta Antitumor EmmenagogueAlthough little used in modern herbalism, beet has a long history of folk use, especially in the treatment of tumours[269]. A decoction prepared from the seed has been used as a remedy for tumours of the intestines. The seed, boiled in water, is said to cure genital tumours[269]. The juice or other parts of the plant is said to help in the treatment of tumours, leukaemia and other forms of cancer such as cancer of the breast, oesophagus, glands, head, intestines, leg, lip, lung, prostate, rectum, spleen, stomach, and uterus[269]. Some figure that

nrakta Europe, including Britain, from Norway south and east to Spain, the Caucasus and Altai. ksacta Road-sides and grassy waste places, especially on chalk and limestone[17].

propta Seed - sow from late winter to late spring in situ. Seed can be slow to germinate, especially from the earlier sowings[200], it is best to mark the rows by sowing a few radishes with the parsnips. The seed has a short viability, very few will still be viable 15 months after harvesting[200].

nwatta Succeeds in most ordinary well-drained soils[16]. Requires an open situation[37]. Prefers a deep rich soil that is not too stiff[1]. The parsnip is often cultivated in the temperate zone for its edible root, there are a number of named varieties[46, 183, 200]. Normally cultivated as a winter root crop, some cultivars are faster to mature and can be available in late summer[200]. The roots are very frost hardy and can be left in the ground to be harvested as required, though they can also be lifted in the autumn and stored for a few months[200]. The flowers are very attractive to hover flies and predatory wasps[201]. Plants have very few insect pests, though they are sometimes attacked by carrot root fly[201]. Growing onions with the parsnips can reduce the damage[201]. Roots of the wild form can quite quickly be increased in size by selective breeding and good cultivation, it is possible to obtain good sized roots in only 6 years. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fleshy. Thick or swollen - fibrous or tap root [2-1].

5.2.81 Myrrhis odorata

Sweet Cicely, Anise

4 tlin 8 cyuc 4 kcaak 3 tcan 3 dwat 1 m hkuc hmimhmtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprkikwis hpa7tmwatli fyifxre7t hjonli

drutta Myrrhis odorata is a PERENNIAL growing to 1 m (3ft 3in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to June, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcaakta Edible Parts: Leaves Root SeedEdible Uses: TeaLeaves - raw or cooked[2, 5, 37, 52]. Excellent raw, the leaves have a delicious sweet aniseed flavour[9] and are liked by the majority of people who try them[K]. They are also used as a flavouring for vegetables[183], and are an important ingredient of the herb mix 'bouquet garni'[244]. They can be cooked with tart fruits in order to reduce their acidity[14, 183]. The plant produces fresh leaves from late winter to early the following winter[200]. The leaves can also be dried for later use[21]. It is best to prevent the plant from flowering if the leaves are required for culinary use, because they lose their flavour when the plant is in flower[244]. Root - raw or cooked[1, 2, 5, 14, 37]. A similar flavour to the leaves[K]. So long as it is not too old, the root can be boiled and mixed with other vegetables or added to salads[9]. Seed - raw or cooked[1, 2, 183]. An aniseed flavour, it is usually used as a flavouring[14, 115] but can also be eaten raw whilst it is still green and before the fibrous coat has formed[1, 9]. It makes an excellent mouth freshener[K]. A tea is made from the leaves[183].

tcanta PolishThe leaves and the seed make good polishes for wood[4, 6, 115]. You just rub them over the wood and then rub the wood with a clean cloth to remove any greenness. It is particularly good on oak panels[5], giving a lovely glossy finish and an aromatic smell[244]. Invertabrate shelter, Nectary. Aromatic.

dwatta Antiseptic Aromatic Carminative Expectorant StomachicThe whole plant, including the seed, is aromatic, carminative, expectorant and stomachic[4]. It is useful in the treatment of coughs and flatulence, and also as a gentle stimulant for the stomach[4, 238]. The root is antiseptic and a decoction has been used to treat snake and dog bites[4,

244]. An ointment made from the roots has been used to ease gout and soothe wounds[244].

nrakta Mountainous regions of Europe, including Britain. ksacta Grassy places, hedges and woods in hilly regions, often near human habitations[4, 9, 17].

propta Seed - best sown as soon as it is ripe since stored seed is difficult to germinate[1]. The seed can be sown in an outdoor seedbed or, if supplies are limited, it can be sown in pots in a cold frame. Thin the seedlings in the outdoor bed as necessary (eat the thinnings) and transplant the young plants into their final positions in the following spring. Prick out the pot-grown seedlings into individual pots when they are large enough to handle and plant them out in spring. Division in spring or autumn. Remove the tapering tap root and cut the remaining root into sections with at least one eye per section and replant in their permanent position.

nwatta Prefers a moist rich soil in a shady position[14, 52, 200]. Thrives in all soils[1] in sun or shade[111, 200]. This species is hardy to about -15°C according to one report[200] whilst another says that it is hardy to at least -20°C[187]. Plants often self-sow freely[200]. Sweet cicely used to be quite widely cultivated as a food plant but is now only occasionally grown in the herb garden. This is a shame since it is an extremely useful and tasty plant to grow and can provide food all year round[K]. A good bee plant[4]. The plant is heat tolerant in zones 7 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

5.2.82 Ribes burejense

Bureja gooseberry,

4 tlin 8 cyuc 4 kcaak 0 tcan 0 dwat 1 m hkuc hmimhmtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprkikwis hpa7tmwatli xre7t hjonli

drutta Ribes burejense is a deciduous Shrub growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in April, and the seeds ripen from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcaakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105]. Acid but palatable, it is a gooseberry and can hang on the bush until November if the birds leave it alone[K]. At this time of year it develops a rather nice black-currant flavour[K]. The fruit is about 10mm in diameter[200].

nrakta Northern N. America - Alaska to N. Asia - Manchuria to N. Korea. ksacta Mountain coniferous forests, slopes and stream banks[74].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. Stored seed requires 3 months cold stratification at 2 to 5°C and should be sown as early in the year as possible[113, 164]. Under normal storage conditions the seed can remain viable for 17 years or more. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter, planting them out in late spring of the following year Cuttings of half-ripe wood, 10 - 15cm with a heel, July/August in a frame[78, 113]. Cuttings of mature wood of the current year's growth, preferably with a heel of the previous year's growth, November to February in a cold frame or sheltered bed outdoors[78, 200].

nwatta Easily grown in a moisture retentive but well-drained loamy soil of at least moderate quality[11, 200].

in April. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

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

kcaakta Edible Parts: Fruit OilEdible Uses: Drink Oil-Fruit - raw or cooked[62, 85, 92, 94, 95, 149]. The fruit can be eaten fresh, dried, mixed with cormeal or made into a jam[183]. The fruit is small with very little flesh, but it is produced in fairly large panicles and so is easily harvested. When soaked for 10 - 30 minutes in hot or cold water it makes a very refreshing lemonade-like drink (without any fizz of course)[85, 92, 149, 183]. The mixture should not be boiled since this will release tannic acids and make the drink astringent. The fruit is about 6mm in diameter[200].

tcanta Basketry Deodorant Deodorant Dye Mordant Oil Repellent TanninThe leaves are rich in tannin. They can be collected as they fall in the autumn and used as a black to brown dye or as a mordant[169, 257]. The fruits can also be used as a mordant[257]. A yellow dye is obtained from the twigs[149]. black dye can be obtained when the twigs are mixed with pine gum[257]. A red-brown dye can be made from the bark and leaves[257]. A pink-tan dye can be made from the fruit[257]. The ashes of the plant can be used as a mordant to fix dyes[257]. An oil is extracted from the seeds[4]. It attains a tallow-like consistency on standing and is used to make candles. These burn brilliantly, though they emit a pungent smoke[4]. The roots have been used as a perfume and deodorant[257]. The buds have been used on the body as a medicinal deodorant and perfume[257]. The leaves have been rubbed on the body as an insect and snake repellent[257]. Some caution should be employed here, see the notes above on toxicity[K]. The branches are tough and slender, they are stripped of their bark and split into several strands then used in basket making[46, 92, 94, 95, 149, 257].

dwatta Analgesic Antipruritic Astringent Contraceptive Deodorant Deodorant Diuretic Emetic Haemostatic Odontalgic Oxytoxic StomachicSkunk bush was employed medicinally by several native North American Indian tribes, who valued it especially for its astringent qualities and used it to treat a range of complaints[257]. It is little, if at all, used in modern herbalism. Due to its potentially toxic nature, it should be used with some caution and preferably only under the supervision of a qualified practitioner. The fruit is analgesic, astringent and stomachic[257]. It has been eaten as a treatment for stomach problems and grippe[257]. The dried berries have been ground into a powder and dusted onto smallpox pustules[257]. The fruit has been chewed as a treatment for toothache and also used as a mouthwash[257]. A decoction of the fruit has been used as a wash to prevent the hair falling out[257]. The leaves are astringent, diuretic, emetic and haemostatic[257]. An infusion of the leaves has been used in the treatment of head colds[257]. A decoction of the leaves has been drunk to induce impotency as a method of contraception[257]. A poultice of leaves has been used to treat itches[257]. An infusion of the bark has been used as a douche after childbirth[257]. The bark has been chewed, and the juice swallowed, as a treatment for colds and sore gums[257]. A decoction of the root bark has been taken to facilitate easy delivery of the placenta[257]. The roots have been used as a deodorant[257]. The buds have been used on the body as a medicinal deodorant and perfume[257].

nrakta Western N. America. ksacta Foothills, canyons, slopes etc, usually on dry rocky soils[62] and especially on limestone outcrops[149].

propta Seed - best sown in a cold frame as soon as it is ripe. Pre-soak the seed for 24 hours in hot water (starting at a temperature of 80 - 90c and allowing it to cool) prior to sowing in order to leach out any germination inhibitors[200]. This soak water can be drunk and has a delicious lemon-flavour. The stored seed also needs hot water treatment and can be sown in early spring in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions

in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 10cm with a heel, July/August in a frame[200]. Root cuttings 4cm long taken in December and potted up vertically in a greenhouse. Good percentage[78, 200]. Suckers in late autumn to winter[200].

nwatta Landscape Uses:Border, Hedge, Massing. Succeeds in a well-drained fertile soil in full sun[11, 200], but produces its best fruit when grown close to moist ground[85]. Judging by the plants native habitat it should succeed in dry soils[K]. The young growth in spring can be damaged by late frosts. This species is closely allied to *R. aromaticum*[11]. Plants have brittle branches and these can be broken off in strong winds[200]. Branches are also susceptible to coral spot fungus[11]. Plants in this genus are notably resistant to honey fungus[200]. Many of the species in this genus are highly toxic and can also cause severe irritation to the skin of some people, whilst other species such as this one are not poisonous. It is relatively simple to distinguish which is which, the poisonous species have axillary panicles and smooth fruits whilst non-poisonous species have compound terminal panicles and fruits covered with acid crimson hairs[1, 4]. The toxic species are sometimes separated into their own genus, *Toxicodendron*, by some botanists[200]. Dioecious. Male and female plants must be grown if seed is required. Special Features: North American native.

5.2.76 Cryptotaenia japonica

Mitsuba, Japanese honewort

4 tlin 8 cyuc 4 kcaak 0 tcan 1 dwat 1 m hkuc pcmimhmhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flat-prkikwis hpa7tmwatli fyifxre7t hjonli

drutta *Cryptotaenia japonica* is an evergreen Perennial growing to 1 m (3ft 3in) by 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

kcaakta Edible Parts: Leaves Root StemEdible Uses: CondimentLeaves and stems - raw or cooked[2, 52, 116]. Used as a flavouring with a parsley-like flavour if you let your imagination run away with you[K]. Seedlings and young leaves can be used in salads[206]. When cooking, the leaves should not be cooked for more than a couple of minutes or the flavour is destroyed[206]. The leaves contain about 2.3% protein, 0.23% fat, 4.4% carbohydrate, 2.1% ash[179]. Root - raw or cooked[2, 52, 116, 183]. Blanched stem - a celery substitute[2, 116]. The seed is used as a seasoning.

dwatta Febrifuge Tonic Women's complaintsWomen's complaints. Used in the treatment of haemorrhages, colds, fevers etc[178]. Used as a tonic for strengthening the body[266].

nrakta E. Asia - China, Japan. ksacta Woodland in hills and mountains[52, 58].

propta Seed - sow April in a greenhouse. Germination is usually rapid, prick out the seedlings into individual pots when they are large enough to handle and plant them out in early summer. The ideal temperature for sowing is about 25°C, though seed does germinate at higher and lower temperatures[206]. Seed can also be sown in early autumn[206]. Division in spring or autumn.

nwatta Succeeds in most soils, preferring a moist shady position under trees where it often self-sows[52]. The leaves tend to turn yellow when plants are grown in full sun[206]. This species is not winter-hardy in all areas of Britain, though plants can tolerate short periods at temperatures down to -10°C[206]. Mitsuba is commonly cultivated as a vegetable in Japan, there are some named varieties[183]. It is usually grown as an annual[206]. It is closely allied to *C. canadensis*, and is considered to be no more than a synonym of that species by some botanists[200]. This plant is adored by slugs and snails and must be protected when small or when new growth is emerging in the spring[K]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant

growth habit is a clumper with limited spread [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

5.2.77 *Hordeum vulgare*

Barley, Common barley

4 tlin 8 cyuc 4 kcaak 0 tcan 3 dwat 1 m hkuc
htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Hordeum vulgare* is a ANNUAL growing to 1 m (3ft 3in) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can not grow in the shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

pcista Exposure to barley flour can cause asthma. Possible trigger for coeliac disease. Possible hypersensitivity to barley [301].

kcaakta Edible Parts: SeedEdible Uses: Coffee Drink Salt SweetenerSeed - cooked as a whole grain or ground up and used as a flour for making bread, porridges etc[2, 7, 46, 183]. It has a low gluten content and so is unsuitable for making wheat-type breads[238, K]. The seed can be fermented into sourdough and many other fermented foods such as 'tempeh' and 'miso'[183]. The seed can also be sprouted and added to salads or the sprouted seed juiced and the juice drunk as a health-food drink[183]. The decorticated seed is called pearl barley. This is no longer viable since the decortication process damages the embryo. It is used in soups, stews etc[238]. Malt is obtained by sprouting the whole seed and then roasting it. The seed is then ground into a flour and boiled in water. The resulting liquid is very sweet and can be used in making beer or other drinks, and as a nutritious sweetener in various foods.[7, 46]. The roasted (unsprouted) seed is used as a coffeee[46, 183] and a salt substitute.

tcanta Biomass Mulch PaperThe stems, after the seed has been harvested, have many uses. They are a source of fibres for making paper, a biomass for fuel etc, they can be shredded and used as a mulch[141, 171].

dwatta Abortifacient Cancer Carminative Demulcent Digestive Diuretic Emollient Expectorant Febrifuge Galactofuge Hypoglycaemic Lentive Nutritive Poulitice StomachicThe shoots are diuretic[218]. The seed sprouts are demulcent, expectorant, galactofuge, lentive and stomachic[176, 218]. They are sometimes abortifacient[218]. They are used in the treatment of dyspepsia caused by cereals, infantile lacto-dyspepsia, regurgitation of milk and breast distension[176]. They are best not given to a nursing mother since this can reduce milk flow[176]. The seed is digestive, emollient, nutritive, febrifuge and stomachic[218]. It is taken internally as a nutritious food or as barley water (an infusion of the germinated seed in water) and is of special use for babies and invalids[238]. Its use is said to reduce excessive lactation[238]. Barley is also used as a poultice for burns and wounds[4, 46, 176, 218]. The plant has a folk history of antitumour activity[218]. The germinating seed has a hypoglycaemic effect preceded by a hyperglycaemic action[218]. Modern research has shown that barley may be of aid in the treatment of hepatitis, whilst other trials have shown that it may help to control diabetes[254]. Barley bran may have the effect of lowering blood cholesterol levels and preventing bowel cancer[254]. Other uses for bronchitis and diarrhoea, and as a source of folic acid and vitamin B12 and B6. Weight loss[301].

nrakta Of uncertain origin. ksacta Not known in the wild, it is found in Britain as a relic of cultivation but does not persist[17].

propta Seed - sow in situ in March or October and only just cover the seed. Make sure the soil surface does not dry out if the weather is dry. Germination takes place within 2 weeks.

nwatta Staple Crop: Balanced carb Under DevelopmentSucceeds in most soils and in climates ranging from sub-arctic to sub-tropical[1, 171]. Easily grown in light soils[162]. Prefers a calcareous soil[7]. Best grown in a

sunny position[238]. Barley first came under cultivation about 12,000 years ago[238]. It is widely cultivated in Temperate areas of the world for its edible seed, there are many named varieties[57, 183]. It succeeds further north than most other cereal crops (it succeeds in Norway at latitude 70° N[142]), and at higher altitudes (it is a staple crop in Tibet)[57, 238]. The Coeleste group contains the hull-less barleys. Although lower yielding than the type, these hull-less seeds are much easier to harvest making them a much easier crop to grow on a small scale[183].

5.2.78 *Rosa villosa*

Apple Rose

4 tlin 8 cyuc 4 kcaak 1 tcan 1 dwat 1.8 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta *Rosa villosa* is a deciduous Shrub growing to 1.8 m (6ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to August, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista There is a layer of hairs around the seeds just beneath the flesh of the fruit. These hairs can cause irritation to the mouth and digestive tract if ingested.

kcaakta Edible Parts: Fruit SeedEdible Uses: TeaFruit - raw or cooked[2, 3, 46, 61, 105]. A pleasant acid pulp, the fruit can also be used in preserves, jams etc[183]. The fruit is about 30mm in diameter[200], but there is only a thin layer of flesh surrounding the many seeds[K]. Rich in vitamin C, there is 1303mg per 100g (fresh weight) of fruit[142]. Some care has to be taken when eating this fruit, see the notes above on known hazards. The seed is a good source of vitamin E, it can be ground into a powder and mixed with flour or added to other foods as a supplement[102, 183]. Be sure to remove the seed hairs[102]. The leaves are used as a tea substitute[46, 61, 183]. A pleasant tasting fruity-flavoured tea is made from the dried fruit[21, 46].

dwatta Cancer Vitamin CThe fruit of many members of this genus is a very rich source of vitamins and minerals, especially in vitamins A, C and E, flavanoids and other bioactive compounds. It is also a fairly good source of essential fatty acids, which is fairly unusual for a fruit. It is being investigated as a food that is capable of reducing the incidence of cancer and also as a means of halting or reversing the growth of cancers[214].

nrakta Europe, including Britain, from Scandanavia south and east to Spain, the Caucasus, W. Asia to Iran. ksacta Woods, hedgerows, scrub etc[17].

propta Seed. Rose seed often takes two years to germinate. This is because it may need a warm spell of weather after a cold spell in order to mature the embryo and reduce the seedcoat[80]. One possible way to reduce this time is to scarify the seed and then place it for 2 - 3 weeks in damp peat at a temperature of 27 - 32°C (by which time the seed should have imbibed). It is then kept at 3°C for the next 4 months by which time it should be starting to germinate[80]. Alternatively, it is possible that seed harvested 'green' (when it is fully developed but before it has dried on the plant) and sown immediately will germinate in the late winter. This method has not as yet(1988) been fully tested[80]. Seed sown as soon as it is ripe in a cold frame sometimes germinates in spring though it may take 18 months. Stored seed can be sown as early in the year as possible and stratified for 6 weeks at 5°C[200]. It may take 2 years to germinate[200]. Prick out the seedlings into individual pots when they are large enough to handle. Plant out in the summer if the plants are more than 25cm tall, otherwise grow on in a cold frame for the winter and plant out in late spring. Cuttings of half-ripe wood with a heel, July in a shaded frame. Overwinter the plants in the frame and plant out in late spring[78]. High percentage[78]. Cuttings of mature wood of the current seasons growth. Select pencil thick shoots in early autumn that are about 20 - 25cm long and plant them in a sheltered position outdoors or in a

cold frame[78, 200]. The cuttings can take 12 months to establish but a high percentage of them normally succeed[78]. Division of suckers in the dormant season. Plant them out direct into their permanent positions. Layering. Takes 12 months[11].

nwatta Succeeds in most well-drained soils[11], preferring a circumneutral soil and a sunny position[200]. Grows well in heavy clay soils. Dislikes water-logged soils[200]. Grows well with alliums, parsley, mignonette and lupins[18, 20]. Garlic planted nearby can help protect the plant from disease and insect predation[18, 20]. Grows badly with box-wood[18]. Formerly cultivated for its edible fruit which, from selected plants, can be 4cm wide[11]. There are some named varieties, 'Wolley Dod' has large fruits with a good flavour[183]. The flowers are semi-double, heavily scented and sweetly fragrant[183]. The foliage has an aroma like ripe apples[245]. Plants often produce suckers[200]. Hybridizes freely with other members of this genus[80]. Plants in this genus are notably susceptible to honey fungus[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2].

5.2.79 *Lilium lancifolium*

Tiger Lily, Devil Lily

4 tlin 8 cyuc 4 kcaak 0 tcan 2 dwat 1.2 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli dyatxre7t hjonli

drutta *Lilium lancifolium* is a BULB growing to 1.2 m (4ft) by 0.3 m (1ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from August to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The pollen is said to be poisonous, producing vomiting, drowsiness and purging[4].

kcaakta Edible Parts: Flowers RootEdible Uses: Bulb - cooked[2, 4, 42, 47]. Somewhat bitterish[105]. Fairly pleasant, when properly cooked they are highly esteemed as a vegetable and somewhat resemble parsnips in flavour[183]. The bulbs are up to 8cm in diameter[266]. They are a good source of starch[105, 183]. The bulb can be dried and ground into powder. Flowers - raw or cooked. Used fresh or dried in salads, soups, rice dishes etc[183].

dwatta Antiinflammatory Cardiac Carminative Diuretic Emmenagogue Emollient Expectorant Ophthalmic Women's complaintsThe bulb is antiinflammatory, diuretic, emmenagogue, emollient and expectorant[240, 279]. They are used to relieve heart diseases, pain in the cardiac region and angina pectoris[240]. They are used in Korea to treat coughs, sore throats, palpitations and boils[279]. The flowers are carminative[240]. They are used to strengthen the eye-lid muscles and are commended in the treatment of myopic astigmatism[240]. A tincture made from the flowering plant, harvested when in full flower, is used in the treatment of uterine neuralgia, congestion, irritation and the nausea of pregnancy[4]. It relieves the bearing-down pain accompanying uterine prolapse and is an important remedy in ovarian neuralgia[4].

nrakta E. Asia - China, Japan, Korea. ksacta Long cultivated and not known in a truly wild situation, though it can naturalise in woodlands[279]. Possibly of hybrid origin involving L. leichtlinii and L. maculatum[90].

propta Seed - this species is completely sterile and does not produce seed. Division with care in the autumn once the leaves have died down. Replant immediately[200]. Bulb scales can be removed from the bulbs in early autumn. If they are kept in a warm dark place in a bag of moist peat, they will produce bulblets. These bulblets can be potted up and grown on in the greenhouse until they are large enough to plant out[200]. Bulbils - gather in late summer when they start to fall off the stems and pot up immediately. Grow on in

a greenhouse until large enough to go outside[200]. Plants can flower in three years from bulbils[4].

nwatta Landscape Uses:Border, Container, Foundation, Massing, Seashore. Prefers an open free-draining humus-rich loamy soil with its roots in the shade and its head in the sun[200]. Prefers a lime-free soil according to some reports[28, 47, 143], whilst one says that it succeeds in a calcareous soil[1] and another that it succeeds in ordinary garden soil[1, 42]. Prefers a deep acid loam[47]. Likes a sunny position according to one report[143] whilst others say that it is best grown in open woodland or amongst dwarf evergreen shrubs[1]. Stem rooting, the bulbs should be planted 15 - 20cm deep[143]. Early to mid autumn is the best time to plant out the bulbs in cool temperate areas, in warmer areas they can be planted out as late as late autumn[200]. Plants grow well in northern gardens in Britain[90]. A sterile triploid species, probably of hybrid origin[90]. A very ornamental plant[1], it is cultivated for its edible bulb in Japan[2, 42, 163]. This species tolerates virus infections, but it can transmit them to other species in this genus and so is best grown away from any of the other species[47]. The plant should be protected against rabbits and slugs in early spring. If the shoot tip is eaten out the bulb will not grow in that year and will lose vigour[200]. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is a bulb.

5.2.80 *Pastinaca sativa*

Parsnip, Wild parsnip

4 tlin 8 cyuc 4 kcaak 2 tcan 1 dwat 1 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta *Pastinaca sativa* is a BIENNIAL growing to 1 m (3ft 3in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Skin contact with the sap can cause photosensitivity and/or dermatitis in some people[65, 76, 218]. Parsnip is said to contain the alleged 'psychotroph' myristicine[218].

kcaakta Edible Parts: Leaves Root SeedEdible Uses: CondimentRoot - raw or cooked[2, 4, 5, 9, 27, 183]. When well grown, the cooked root has a very tender texture, though it is rather chewy raw[K]. It is best harvested after there have been some autumn frosts because it will have developed a sweeter flavour[61]. The root is delicious baked, it can also be used in soups etc and can be added to cakes, pies and puddings[183]. Leaves and young shoots - cooked with other greens as a vegetable or added to soups etc[9, 183]. Used in early spring[9]. The seed is used as a condiment[9]. Similar in taste to dill[183].

tcanta Insecticide RepellentThe leaves and roots are used to make an insect spray[20]. Roughly chop the leaves and roots, put them in a basin with enough water to cover, leave them overnight then strain and use as an insecticide against aphids and red spider mite[201].

dwatta Poulitice Women's complaintsA tea made from the roots has been used in the treatment of women's complaints[222]. A poultice of the roots has been applied to inflammations and sores[222]. The root contains xanthotoxin, which is used in the treatment of psoriasis and vitiligo[222]. Xanthotoxin is the substance that causes photosensitivity (see note above on toxicity)[222].

see the notes above on toxicity. Flowers - raw or cooked. The root is made into a tea-like beverage[105, 161, 183].

tcanta MusicalThe stem is easily hollowed and can be used to make a whistle[212].

dwaatta Diuretic PurgativeThe bark and the leaves are used as a diuretic and purgative[212]. The blossoms have been used in the treatment of measles[257].

nrakta N. America - British Columbia to Newfoundland, south to Georgia, Iowa, Colorado and California. ksacta Moist to wet soils along streams, in woods and open areas from valleys to around 3,000 metres[212].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame, when it should germinate in early spring. Stored seed can be sown in the spring in a cold frame but will probably germinate better if it is given 2 months warm followed by 2 months cold stratification first[78, 98, 113]. Prick out the seedlings into individual pots when they are large enough to handle. If good growth is made, the young plants can be placed in their permanent positions during the early summer. Otherwise, either put them in a sheltered nursery bed, or keep them in their pots in a sheltered position and plant them out in spring of the following year. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame[78]. Cuttings of mature wood of the current season's growth, 15 - 20cm with a heel, late autumn in a frame or a sheltered outdoor bed[78].

nwatta Tolerates moist soils, including chalk[200], but prefers a moist loamy soil[11, 200]. Grows well in heavy clay soils. Tolerates some shade but is best in a sunny position[11]. Tolerates atmospheric pollution and coastal situations[200]. Closely related to *S. racemosa* and considered part of that species by some botanists[43]. Plants in this genus are notably resistant to honey fungus[200].

5.2.173 Decaisnea fargesii

Blue Sausage Fruit

4 tin 8 cyuc 3 kcaak 0 tcan 0 dwat 4 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta Decaisnea fargesii is a deciduous Shrub growing to 4 m (13ft) by 4 m (13ft) at a medium rate. See above for USDA hardness. It is hardy to UK zone 5 and is not frost tender. It is in leaf from April to October; in flower in June, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw[1, 105]. A sweet taste, but rather insipid[109]. A very nice delicate flavour according to our palates[K]. The fruit looks like a bright blue sausage or broad bean pod[K] and is up to 10cm long[200]. You peel off the skin in much the same way as you would peel a broad bean pod, this reveals a line of seed running the entire length of the fruit surrounded by a relatively thin layer of flesh[K].

nrakta E. Asia - W. China ksacta Moist woods and thickets to 1600 metres[109]. Mixed forests, scrub on mountain slopes, wet area in ravines at elevations of 900 - 3600 metres[266].

propta Seed - best sown as soon as it is ripe in a cold frame[200], it then usually germinates freely in early spring[K]. Sow stored seed in February in a greenhouse. This usually germinates well, within 1 - 3 months at 18°C[175]. Prick out the seedlings into individual pots as soon as they are large enough to handle and grow them on under protection for their first winter. Plant out in late spring after the last expected frosts. Cuttings.

nwatta An easily grown plant[182] succeeding in most soils[202], but it prefers a rich moist loamy soil and a sunny position sheltered from cold winds[175, 200]. Succeeds in partial shade[200]. Prefers partial shade, succeeding in full sun if the soil is reliably moist[202]. Dislikes drought[K]. A very cold-hardy plant when fully dormant, but the flowers and young growth in spring can be damaged by late frosts[11, 200]. Plants usually fruit well and regularly in Cornwall[11, 58] and a specimen has been seen on a number of occasions at Kew Botanical gardens laden down with fruit[K]. The flowers are produced at the tips of the new upright growths in

the spring[11, 202]. Plants take some years from seed to produce fruit[202]. A very ornamental plant[1]. It is fairly fast growing but it looks gaunt and open in the winter[182]. Plants do not usually require pruning[202]. In some new florars, this species is seen as no more than a synonym for *D. insignis*[266]. The plant is heat tolerant in zones 9 through 7. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multi-stemmed with multiple stems from the crown [1-2].

5.2.174 Eleutherococcus sieboldianu:

Ukogi, Five Leafed Aralia

4 tin 8 cyuc 3 kcaak 2 tcan 0 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hyhisrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Eleutherococcus sieboldianus is a deciduous Shrub growing to 3 m (9ft) by 2.5 m (8ft) at a slow rate. See above for USDA hardness. It is hardy to UK zone 4. It is in flower from June to July, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. It can tolerate atmospheric pollution.

kcakta Edible Parts: LeavesEdible Uses: TeaYoung leaves - cooked[46, 61, 177]. A delicious somewhat fragrant flavour[105, 183]. The dried leaves are a tea substitute[183]. tcanta Hedge HedgeThe plant is used as a hedge[200]. nrakta E. Asia - China, Japan. ksacta Escaped from cultivation in Japan, where it grows wild in calcareous soils[275].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame[200]. It can be slow to germinate. Stored seed requires 6 months warm followed by 3 months cold stratification[113] and can be very slow to germinate[133]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for at least the first winter. Plant out in late spring or early summer. Cuttings of half-ripe wood, July/August in a frame[113, 200]. Cuttings of ripe wood of the current season's growth, 15 - 30cm long in a cold frame[238]. Root cuttings in late winter[200]. Division of suckers in the dormant season[200].

nwatta Landscape Uses:Border, Hedge, Massing, Screen, Specimen. Prefers a light warm open loamy humus-rich soil and a position sheltered from north and east winds[11, 200]. Prefers a well-drained soil and full sun[200]. Thrives in sun or shade according to another report. Tolerates urban pollution and poor soils[200]. Plants are hardy to at least -15°C if they are sheltered from cold winds[200]. Cultivated as a medicinal and culinary plant in Japan[58], there are some named varieties selected for their ornamental value[200]. Special Features:Attractive foliage, Not North American native.

5.2.175 Prunus sibirica

Siberian Apricot

4 tin 8 cyuc 3 kcaak 4 tcan 2 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Prunus sibirica is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardness. It is hardy to UK zone 5. It is in flower in March, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils

a reasonable level of side shade[200]. Trees are usually attacked by aphids which cover the ground and the leaves with a sticky honeydew[188]. Closely related to *T. americana*[11]. Quite tolerant of root disturbance, semi-mature trees up to 5 metres tall have been transplanted successfully. Plants in this genus are notably resistant to honey fungus[200].

5.2.112 Juglans regia fallax

Walnut

4 tin 8 cyuc 3 kcaak 0 tcan 0 dwat 30 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyif hjonli

drutta Juglans regia fallax is a deciduous Tree growing to 30 m (98ft 5in). See above for USDA hardness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to June. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Oil SeedEdible Uses: OilSeed - raw or cooked[46, 61, 105]. Thin shelled[200]. An edible oil is obtained from the seed, it tends to go rancid quickly.

tcanta Herbicide OilPlants produce chemicals which can inhibit the growth of other plants. These chemicals are dissolved out of the leaves when it rains and are washed down to the ground below, reducing the growth of plants under the tree[18, 20, 159]. The roots also produce substances that are toxic to many plant species, especially apples (*Malus* species), members of the Ericaceae, *Potentilla* spp and the white pines (certain *Pinus* spp.)[200].

nrakta E. Asia - S. China to the Himalayas. ksacta Forests in mountain regions[46].

propta The seed is best sown as soon as it is ripe in individual deep pots in a cold frame[80]. You need to protect it from mice, birds, squirrels etc. The seed usually germinates in late winter or the spring. Plant out the seedlings into their permanent positions in early summer and give some protection from the cold for their first winter or two. The seed can also be stored in cool moist conditions (such as the salad compartment of a fridge) over the winter and sown in early spring but it may then require a period of cold stratification before it will germinate[78, 80, 113].

nwatta Requires a deep well-drained loam and a sunny position sheltered from strong winds[1, 11]. Prefers a slightly alkaline soil[200]. The dormant plant is very cold-tolerant, but the young growth in spring, however, can be damaged by late frosts. Plants produce a deep taproot and they are intolerant of root disturbance[1, 11]. Seedlings should be planted out into their permanent positions as soon as possible and given some protection for their first winter or two since they are somewhat tender when young[1, 11]. Flower initiation depends upon suitable conditions in the previous summer[200]. The flowers and young growths can be destroyed by even short periods down to -2°C, but fortunately plants are usually late coming into leaf[200]. Any pruning should only be carried out in late summer to early autumn or when the plant is fully dormant otherwise wounds will bleed profusely and this will severely weaken the tree[200]. Trees have a dense canopy which tends to reduce plant growth below them. We have no specific information for this species, but the roots of several members of this genus produce substances that are toxic to many plant species, especially apples (*Malus* species), members of the Ericaceae, *Potentilla* spp and the white pines (certain *Pinus* spp.)[200]. The leaves of many species also secrete substances that have an inhibitory affect on plants growing underneath them. All in all this is not a very good companion plant[K]. This plant is cultivated for its edible seed in China[46, 61]. This species is notably susceptible to honey fungus[200].

5.2.113 Juglans intermedia

Hind's Black Walnut, Northern California walnut, Paradox hybrid walnuH

4 tin 8 cyuc 3 kcaak 0 tcan 0 dwat 30 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyif hjonli

drutta Juglans intermedia is a deciduous Tree growing to 30 m (98ft 5in). See above for USDA hardness. It is hardy to UK zone 5. It is in flower from May to June. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Oil SeedEdible Uses: OilSeed - raw[183]. An edible oil is obtained from the seed, it tends to go rancid quickly.

tcanta Herbicide OilPlants produce chemicals which can inhibit the growth of other plants. These chemicals are dissolved out of the leaves when it rains and are washed down to the ground below, reducing the growth of plants under the tree[18, 20, 159]. The roots of many members of this genus produce substances that are toxic to many plant species, especially apples (*Malus* species), members of the Ericaceae, *Potentilla* spp and the white pines (certain *Pinus* spp.)[200].

nrakta A hybrid of garden origin, *J. regia* x *J. nigra*. ksacta Not known in the wild.

propta The seed is best sown as soon as it is ripe in individual deep pots in a cold frame[80]. You need to protect it from mice, birds, squirrels etc. The seed usually germinates in late winter or the spring. Plant out the seedlings into their permanent positions in early summer and give some protection from the cold for their first winter or two. The seed can also be stored in cool moist conditions (such as the salad compartment of a fridge) over the winter and sown in early spring but it may then require a period of cold stratification before it will germinate[78, 80]. This species is a natural hybrid and may not breed true from seed.

nwatta Requires a deep well-drained loam and a sunny position sheltered from strong winds[1, 11]. Prefers a slightly alkaline soil[200]. Plants produce a deep taproot and they are intolerant of root disturbance[1, 11]. Seedlings should be planted out into their permanent positions as soon as possible and given some protection for their first winter or two since they are somewhat tender when young[1, 11]. Flower initiation depends upon suitable conditions in the previous summer[200]. The flowers and young growths can be destroyed by even short periods down to -2°C, but fortunately plants are usually late coming into leaf[200]. Any pruning should only be carried out in late summer to early autumn or when the plant is fully dormant otherwise wounds will bleed profusely and this will severely weaken the tree[200]. Trees have a dense canopy which tends to reduce plant growth below them. We have no specific information for this species, but the roots of several members of this genus produce substances that are toxic to many plant species, especially apples (*Malus* species), members of the Ericaceae, *Potentilla* spp and the white pines (certain *Pinus* spp.)[200]. The leaves of many species also secrete substances that have an inhibitory affect on plants growing underneath them. All in all this is not a very good companion plant[K]. A hybrid, *J. nigra* x *J. regia*, sometimes cultivated for its edible seed, there are some named varieties[183].

5.2.114 Juglans regia kamaonia

Walnut

4 tin 8 cyuc 3 kcaak 0 tcan 3 dwat 30 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyif hjonli

drutta Juglans regia kamaonia is a deciduous Tree growing to 30 m (98ft 5in). See above for USDA hardness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to June. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Oil SeedEdible Uses: OilSeed - raw or cooked[51, 177, 272]. An edible oil is obtained from the seed, it tends to go rancid quickly[51].

tcanta Herbicide Oil Tannin WoodThe bark and the unripe rind of the fruit are good sources of tannin[51, 272]. Plants produce chemicals which can inhibit the growth of other plants. These chemicals are dissolved out of the leaves when it rains and are washed down to the ground below, reducing the growth of plants under the tree[18, 20, 159]. The roots also produce substances that are toxic to many plant species, especially apples (*Malus* species), members of the Ericaceae, *Potentilla* spp and the white pines (certain *Pinus* spp.)[200]. Wood - hard, strongly grained, polishes well. Used for making furniture, carved work, veneers etc[51, 272].

dwatta Alternative Anthelmintic Antirheumatic Astringent Detergent TonicThe bark, leaves and fruit are used medicinally[51]. No more details are given in this report but another report on Indian medicinal plants gives the following uses for *J. nigra* (and almost certainly refers to this subspecies): The bark is anthelmintic and detergent[240]. The leaves are anthelmintic, astringent and tonic[240]. A decoction is considered to be specific in the treatment of strumous sores[240]. The fruit is alterative[240]. It is used in the treatment of rheumatism[240].

nrakta E. Asia - Himalayas from Kashmir to S.E. Tibet. ksacta Forests, 1500 - 3000 metres in the Himalayas[51].

propta The seed is best sown as soon as it is ripe in individual deep pots in a cold frame[80]. You need to protect it from mice, birds, squirrels etc. The seed usually germinates in late winter or the spring. Plant out the seedlings into their permanent positions in early summer and give some protection from the cold for their first winter or two. The seed can also be stored in cool moist conditions (such s the salad compartment of a fridge) over the winter and sown in early spring but it may then require a period of cold stratification before it will germinate[78, 80, 113].

nwatta Requires a deep well-drained loam and a sunny position sheltered from strong winds[1, 11]. Prefers a slightly alkaline soil[200]. The dormant plant is quite cold-tolerant, but the young growth in spring, however, can be damaged by late frosts. Plants produce a deep taproot and they are intolerant of root disturbance[1, 11]. Seedlings should be planted out into their permanent positions as soon as possible and given some protection since they are somewhat tender when young[1, 11]. Flower initiation depends upon suitable conditions in the previous summer[200]. The flowers and young growths can be destroyed by even short periods down to -2°C, but fortunately plants are usually late coming into leaf[200]. Any pruning should only be carried out in late summer to early autumn or when the plant is fully dormant otherwise wounds will bleed profusely and this will severely weaken the tree[200]. Trees have a dense canopy which tends to reduce plant growth below them. We have no specific information for this species, but the roots of several members of this genus produce substances that are toxic to many plant species, especially apples (*Malus* species), members of the Ericaceae, *Potentilla* spp and the white pines (certain *Pinus* spp.)[200]. The leaves of many species also secrete substances that have an inhibitory affect on plants growing underneath them. All in all this is not a very good companion plant[K]. This plant is cultivated for its edible seed in W. Himalayas[51]. This species is notably susceptible to honey fungus[200].

5.2.115 *Aesculus hippocastanum*

Horse Chestnut, European Horsechestnut, Common Horsechestnut

4 tlin 7 cyuc 3 kcaak 3 tcan 4 dwat 30 m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyik hpa7tli flatprikliws hpa7tmwatli xre7t hjonli

drutta *Aesculus hippocastanum* is a deciduous Tree growing to 30 m (98ft) by 15 m (49ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower in May, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

pista The seed is rich in saponins[10, 21, 65]. Although poisonous, saponins are poorly absorbed by the human body and so most pass through without harm. Saponins are quite bitter and can be found in many common foods such as some beans. They can be removed by carefully leaching the seed or flour in running water. Thorough cooking, and perhaps changing the cooking water once, will also normally remove most of them. However, it is not advisable to eat large quantities of food that contain saponins. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K]. Avoid in patients with kidney or liver disease. Avoid if taking warfarin as can interfere with anticoagulant therapy [301].

kcakta Edible Parts: SeedEdible Uses: CoffeeThe roasted seed is used as a coffee substitute[2, 7]. Seed - cooked. It can be dried, ground into a powder and used as a gruel[7, 46, 55, 61]. The seed is quite large, about 3cm in diameter, and is easily harvested. It is usually produced in abundance in Britain. Unfortunately the seed is also rich in saponins, these must be removed before it can be used as a food and this process also removes many of the minerals and vitamins, leaving behind mainly starch. See also the notes above on toxicity. The seed contains up to 40% water, 8 - 11% protein and 8 - 26% toxic saponins[218]. The following notes apply to *A. californica*, but are probably also relevant here:- The seed needs to be leached of toxins before it becomes safe to eat - the Indians would do this by slow-roasting the nuts (which would have rendered the saponins harmless) and then cutting them into thin slices, putting them into a cloth bag and rinsing them in a stream for 2 - 5 days[213].

tcanta Dye Soap Starch Tannin WoodSaponins in the seed are used as a soap substitute[169]. The saponins can be easily obtained by chopping the seed into small pieces and infusing them in hot water. This water can then be used for washing the body, clothes etc. Its main drawback is a lingering odour of horse chestnuts[K]. The seed contains variable amounts of saponins, up to a maximum of 10%[240]. A starch obtained from the seed is used in laundering[100]. The bark and other parts of the plant contain tannin, but the quantities are not given[223]. A yellow dye is obtained from the bark[4]. The flowers contain the dyestuff quercetin[223]. Wood - soft, light, not durable. Of little commercial value, it is used for furniture, boxes, charcoal[2, 11, 46, 61].

dwatta Alternative Analgesic Antiinflammatory Antirheumatic Astringent Bach Diuretic Dysentery Expecto-rant Febrifuge Haemostatic Malaria Narcotic Tonic Vasoconstrictor VulneraryHorse chestnut is an astringent, anti-inflammatory herb that helps to tone the vein walls which, when slack or distended, may become varicose, haemorrhoidal or otherwise problematic[254]. The plant also reduces fluid retention by increasing the permeability of the capillaries and allowing the re-absorption of excess fluid back into the circulatory system[254]. This plant is potentially toxic if ingested and should not be used internally without professional supervision[254]. Alternative, analgesic, haemostatic and vulnerary[165, 218]. The bark is anti-inflammatory, astringent, diuretic, febrifuge, narcotic, tonic and vasoconstrictive[4, 7, 222]. It is harvested in the spring and dried for later use[4]. The plant is taken in small doses internally for the treatment of a wide range of venous diseases, including hardening of the arteries, varicose veins, phlebitis, leg ulcers, haemorrhoids and frostbite[238, 254]. It is also made into a lotion or gel for external application[254]. A tea made from the bark is used in the treatment of malaria and dysentery, externally in the treatment of lupus and skin ulcers[4, 222]. A tea made from the leaves is tonic and is used in the treatment of fevers and whooping cough[222, 240, 254]. The pericarp is peripherally vasoconstrictive[7]. The seeds are decongestant, expectorant and tonic[7, 21]. They have been used in the treatment of rheumatism, neuralgia and haemorrhoids[4]. They are said to be narcotic and that 10 grains of the nut are equal to 3 grains of opium[213]. An oil extracted from the seeds has been used externally as a treatment for rheumatism[254]. A compound of the powdered roots is analgesic and has been used to treat chest pains[257]. The buds are used in Bach flower remedies - the keywords for prescribing it are 'Faireule to learn by experience', 'Lack of observation in the lessons of life' and hence 'The need of repetition'[209]. The flowers are used in Bach flower remedies - the keywords for prescribing it are 'Persistent unwanted thoughts' and 'Mental arguments

5.2.170 *Staphylea trifolia*

American Bladder Nut

4 tlin 8 cyuc 3 kcaak 2 tcan 1 dwat 4 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliws hpa7tmwatli xre7t hjonli

drutta *Staphylea trifolia* is a deciduous Shrub growing to 4 m (13ft 1in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to June, and the seeds ripen from September to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Oil SeedEdible Uses: OilSeed - raw or cooked[161, 177]. They are eaten like pistachios[2]. The seed can be used in place of walnuts (*Juglans* spp) in making chocolate-chip cookies[183]. A sweet edible oil is obtained from the seed[2]. It is used for cooking purposes[183].

tcanta Oil Soil stabilizationPlants have dense underground root systems and are of some value in erosion control[229].

dwatta SkinAn infusion of the powdered bark has been used as a wash for sore faces[257].

nrakta Eastern N. America - Quebec to Georgia, west to Kansas and Nebraska. ksacta Rich moist thickets along streams and the borders of woods[43, 229].

propta Seed - this can be very slow to germinate, sometimes taking 18 months or more. It is best sown as soon as it is ripe in a cold frame[200], and some of it at least should then germinate in the spring. Stored seed should be sown as early in the year as possible and given cold stratification - it might not germinate until spring of the following year. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in the greenhouse for their first winter. Plant them out early the following summer. Cuttings of half-ripe wood, 5 - 8cm with a heel, July/August in a frame. Fair to good percentage[78]. Layering in July/August. Takes 15 months. Good percentage[78].

nwatta Tolerant of a wide range of soils so long as they are not too dry[11, 182, 200], it prefers a rich loamy soil in full sun or semi-shade[200]. A fast-growing but short-lived tree in the wild[229]. The plants flower best in years that follow hot summers[200]. Plants in this genus are notably resistant to honey fungus[200].

5.2.171 *Crataegus x grignonensis*

4 tlin 8 cyuc 3 kcaak 3 tcan 2 dwat 4 m hkuc hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatprikliwsslip hpa7tmwatli xre7t hjonli

drutta *Crataegus x grignonensis* is a deciduous Shrub growing to 4 m (13ft 1in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. The fruit can be used in making pies, preserves, etc, and can also be dried for later use. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with

high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta A hybrid species of garden origin, *C. cruc-galli* x *C. pubescens*. ksacta Not known in the wild.

propta Seed - This is a hybrid species and it will not breed true from seed. If this is no problem, then the seed is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245].

5.2.172 *Sambucus pubens*

American Red Elder

4 tlin 8 cyuc 3 kcaak 1 tcan 1 dwat 4 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikliws hpa7tmwatli xre7t hjonli

drutta *Sambucus pubens* is a deciduous Shrub growing to 4 m (13ft 1in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

pista Although no specific mention has been seen for this species, the leaves and stems of some, if not all, members of this genus are poisonous[9, 76]. The fruit of many species (although no records have been seen for this species) has been known to cause stomach upsets to some people. Any toxin the fruit might contain is liable to be of very low toxicity and is destroyed when the fruit is cooked[65, 76]. NC State University have noted Cyanogenic glycoside and alkaloids can cause low toxicity if eaten.

kcakta Edible Parts: Flowers FruitEdible Uses: TeaFruit - raw or cooked[105, 161, 257]. A bitter flavour[183]. The fruit is quite nutritious, having a relatively high fat and protein as well as carbohydrate content[212]. The fruit can be dried prior to use, it will then lose some of its rank taste[183]. The fruit is about 5mm in diameter and is borne in large clusters making it easy to harvest[200]. Some caution is advised,

by Wind. Suitable for: medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: CoffeeSeed - raw or cooked[257]. A staple food for several native North American Indian tribes[257]. A sweet taste[61, 62, 63, 85, 161]. The seed is about 2cm long and wide[82, 200], it can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. If the seed contains bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost[85]. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute.

tcanta Buttons Fuel Repellent Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. The seed cups are used as buttons[5]. Wood - hard, heavy, close-grained. The trees are generally too small to be of use commercially, though the wood is used locally for lumber and also makes a good fuel[229].

dwatta Analgesic Astringent Cathartic DysenteryAny galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4]. The acorns have been eaten to give greater sexual potency[257]. The root bark is analgesic and cathartic[257]. A decoction has been used to treat postpartum pain and facilitate delivery of the placenta[257].

nrakta Western N. America - Rocky Mountains from Utah and Wyoming to Mexico. ksacta Dry foothills and lower mountain slopes, 1350 - 2800 metres[62].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly. Division of suckers in the dormant season[11].

nwatta Landscape Uses:Specimen, Street tree. Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. Prefers warmer summers than are usually experienced in Britain, trees often grow poorly in this country and fail to properly ripen their wood resulting in frost damage overwinter[200]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. A slow growing shrub that often produces suckers and grows as a thicket[182, 229], it occasionally makes a small tree[229]. Seed production is cyclical, a year when good crops are produced is followed by several years of light production[229]. The tree flowers on new growth produced in spring, the seed ripening in its first year[200, 229]. Hybridizes freely with other members of the genus[200]. This species is notably resistant to honey fungus[88, 200]. Special Features: North American native, Inconspicuous flowers or blooms. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to

suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A clumping plant, forming a colony from shoots away from the crown but with a limited spread [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

5.2.169 Sambucus racemosa

American Red Elder

4 tlin 8 cyuc 3 kcak 1 tcan 1 dwat 4 m hkuc hmimhtut cyuti tcup hwicli hrasjlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Sambucus racemosa is a deciduous Shrub growing to 4 m (13ft 1in). See above for USDA hardness. It is hardy to UK zone 4. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

pcista Although no specific mention has been seen for this species, the leaves and stems of some, if not all, members of this genus are poisonous[9, 76]. The fruit of many species (although no records have been seen for this species) has been known to cause stomach upsets to some people. Any toxin the fruit might contain is liable to be of very low toxicity and is destroyed when the fruit is cooked[65, 76]. NC State University have noted Cyanogenic glycoside and alkaloids can cause low toxicity if eaten.

kcakta Edible Parts: Flowers FruitEdible Uses: Fruit - raw or cooked[105, 161, 257]. A bitter flavour[183]. The fruit is quite nutritious, having a relatively high fat and protein as well as carbohydrate content[212]. The fruit can be dried prior to use, it will then lose some of its rank taste[183]. The fruit is about 5mm in diameter and is borne in large clusters making it easy to harvest[200]. Some caution is advised, see the notes above on toxicity. Flowers - raw or cooked. The root is made into a tea-like beverage[105, 161, 183].

tcanta Repellent Straw WoodThe stem is easily hollowed and can be used to make a whistle[212].

dwatta Anodyne Carminative Depurative Diaphoretic Diuretic Laxative Purgative Resolvent Vitamin C Vulnerary-The bark and the leaves are used as a diuretic and purgative[212]. The blossoms have been used in the treatment of measles[257].

nrakta N. America - British Columbia to Newfoundland, south to Georgia, Iowa, Colorado and California. ksacta Moist to wet soils along streams, in woods and open areas from valleys to around 3,000 metres[212].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame, when it should germinate in early spring. Stored seed can be sown in the spring in a cold frame but will probably germinate better if it is given 2 months warm followed by 2 months cold stratification first[78, 98, 113]. Prick out the seedlings into individual pots when they are large enough to handle. If good growth is made, the young plants can be placed in their permanent positions during the early summer. Otherwise, either put them in a sheltered nursery bed, or keep them in their pots in a sheltered position and plant them out in spring of the following year. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame[78]. Cuttings of mature wood of the current season's growth, 15 - 20cm with a heel, late autumn in a frame or a sheltered outdoor bed[78].

nwatta Tolerates most soils, including chalk[200], but prefers a moist loamy soil[11, 200]. Grows well in heavy clay soils. Tolerates some shade but is best in a sunny position[1]. Tolerates atmospheric pollution and coastal situations[200]. Closely related to *S. racemosa* and considered part of that species by some botanists[43]. Plants in this genus are notably resistant to honey fungus[200].

and conversations'[209]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve *Aesculus hippocastanum* for chronic venous insufficiency in the legs (see [302] for critics of commission E).

nrakta Europe - N. Greece and Albania. Naturalized in Britain[17]. ksacta Mountain woods[50].

propta Seed - best sown outdoors or in a cold frame as soon as it is ripe[11, 80]. The seed germinates almost immediately and must be given protection from severe weather[130]. The seed has a very limited viability and must not be allowed to dry out. Stored seed should be soaked for 24 hours prior to sowing and even after this may still not be viable[80, 113]. It is best to sow the seed with its 'scar' downwards[130]. If sowing the seed in a cold frame, pot up the seedlings in early spring and plant them out into their permanent positions in the summer.

nwatta Landscape Uses:Firewood, Pollard, Specimen, Street tree. Prefers a deep loamy well-drained soil but is not too fussy tolerating poorer drier soils[11, 200]. Tolerates exposed positions and atmospheric pollution[200]. A very ornamental and fast-growing tree[1, 4], it succeeds in most areas of Britain but grows best in eastern and south-eastern England[200]. Trees are very hardy when dormant, but the young growth in spring can be damaged by late frosts. The flowers have a delicate honey-like perfume[245]. Trees are tolerant of drastic cutting back and can be severely lopped[200]. They are prone to suddenly losing old heavy branches[98]. The tree comes into bearing within 20 years from seed[98]. Most members of this genus transplant easily, even when fairly large[11]. Special Features: Attractive foliage, Not North American native, Naturalizing, Blooms are very showy.

5.2.116 Carya glabra

Sweet Pignut, Pignut hickory, Broom Hickory, Pignut Hickory
4 tlin 9 cyuc 3 kcak 0 tcan 0 dwat 30 m hkuc htut cyuti kyuctup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyf hjonli

drutta Carya glabra is a deciduous Tree growing to 30 m (98ft) by 20 m (65ft) at a slow rate. See above for USDA hardness. It is hardy to UK zone 4. It is in leaf from June to October, in flower from April to May, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: Sap SeedEdible Uses: Seed - raw or cooked[61, 101, 161]. Very variable in quality, some are sweet and pleasant whilst others are bitter and astringent[1, 2, 11, 46, 63, 183]. In general it is inferior to other hickories[117, 159]. The nut is rather small[K], has a very thick shell and contains very little edible matter[82, 226]. The seed ripens in late autumn and, when stored in its shell in a cool place, will keep for at least 6 months[K]. Sap - tapped in spring and used as a refreshing drink. Sweet[101].

tcanta Fuel WoodWood - hard, strong, tough, very flexible. It weighs 51lb per cubic foot[235]. An excellent timber, it is used for tool handles, agricultural implements etc[46, 61, 82]. A very good fuel, burning well and giving off a lot of heat[46, 61, 82].

nrakta Eastern N. America - Ontario to Florida. ksacta Dry woods and on slopes[43, 229]. The best specimens are found in deep moist well-drained soils[229].

propta Seed - requires a period of cold stratification - seed given 3 months cold stratification had a 91% germination rate[113]. Best sown in a cold frame as soon as it is ripe[78]. Stored seed should be kept moist (but not wet) prior to sowing and should be sown in a cold frame as soon as possible[78]. Where possible, sow 1 or 2 seeds only in each deep pot and thin to the best seedling. If you need to transplant the seedlings, then do this as soon as they are large enough to handle, once more using deep pots to accommodate the tap root. Put the plants into their permanent positions as soon as possible, preferably in their first summer, and give some protection from the cold for at least the first winter. Seed can also be sown in situ so long as protection is given from mice

etc and the seed is given some protection from cold[200] (a plastic bottle with the top and bottom removed and a wire mesh top fitted to keep the mice out is ideal)

nwatta Landscape Uses:Firewood, Pest tolerant, Aggressive surface roots possible. Prefers a deep moisture-retentive loam in a sunny sheltered position, requiring a good summer for best development[1, 63, 137, 200]. Succeeds in drier soils than most members of this genus[200]. Slow growing[200]. Sometimes cultivated for its edible seed, there are some named varieties[63]. Trees take 25 - 30 years before they commence bearing seeds and peak production does not begin until they are about 80 years old[229]. Trees thrive in Britain, often bearing fruit[11]. Trees are planted for timber in Germany[50]. Plants are strongly tap-rooted and should be planted in their permanent positions as soon as possible[1, 137]. Sowing in situ would be the best method so long as the seed could be protected from mice[1, 200]. Trees are late coming into leaf (usually late May to June) and lose their leaves early in the autumn (usually in October)[137]. During this time they cast a heavy shade. These factors combine to make the trees eminently suitable for a mixed woodland planting with shrubs and other trees beneath them[137]. Plants in this genus are notably resistant to honey fungus[200]. Most species in this genus have quite a wide range of distribution and, in order to find trees more suited to this country, seed from the most appropriate provenances should be sought[137]. Most trees growing in Britain at present tend to only produce good seed after hot summers[137]. Trees are self-fertile but larger crops of better quality seeds are produced if cross-pollination takes place[229]. Special Features:North American native, Attracts butterflies, Inconspicuous flowers or blooms.

5.2.117 Tilia amurensis

4 tlin 8 cyuc 3 kcak 0 tcan 1 dwat 30 m hkuc hmimhtut cyuti tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Tilia amurensis is a deciduous Tree growing to 30 m (98ft 5in) at a medium rate. See above for USDA hardness. It is hardy to UK zone 4 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: TeaYoung leaves - raw[K]. A famine food, it is only used when all else fails[177]. A very good chocolate substitute is made from a paste of the ground fruits and flowers[2]. Trials on marketing the product failed because the paste decomposes readily[2].

tcanta FibreThe fibrous inner bark is used for making sandals etc[151].

dwatta Antispasmodic Diaphoretic SedativeA tea made from the flowers is antispasmodic, diaphoretic and sedative[226].

nrakta E. Asia - Korea, Manchuria, S.E. Siberia. ksacta Grows in woods in N. Korea[11].

propta Seed - much of the seed produced in Britain is not viable, cut a few seedcases open to see if there is a seed inside[80]. If possible, obtain fresh seed that is ripe but has not as yet developed a hard seed coat and sow it immediately in a cold frame. It may germinate in the following spring though it could take 18 months[80]. Stored seed can be very slow to germinate. It has a hard seed coat, embryo dormancy and a hard coat on the pericarp. All these factors mean that the seed may take up to 8 years to germinate[80]. One way of shortening this time is to stratify the seed for 5 months at high temperatures (10°C at night, up to 30°C by day) and then 5 months cold stratification[80]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Layering in spring just before the leaves unfurl. Takes 1 - 3 years[78]. Suckers, when formed, can be removed with as much root as possible during the dormant season and replanted immediately[200].

nwatta Prefers a good moist loamy alkaline to neutral soil but succeeds on slightly acid soils[11, 200]. Grows poorly

on any very dry or very wet soil[200]. Dislikes exposed positions[200]. Succeeds in sun or semi-shade[188]. Prefers a continental climate, growing more slowly and not producing fertile seed in areas with cool summers[200]. Grows best in a woodland situation, young plants tolerate a reasonable level of side shade[200]. This species is closely related to *T. cordata*[200]. It is also closely related to *Tilia japonica*, differing in having smaller leaves and bracts, and shorter cyme[266]. Lime trees tend to hybridise freely if other members of the genus are growing nearby[238]. If growing plants from seed it is important to ensure the seed came from a wild source or from an isolated clump of the single species[K]. Trees are usually attacked by aphids which cover the ground and the leaves with a sticky honeydew[188]. Quite tolerant of root disturbance, semi-mature trees up to 5 metres tall have been transplanted successfully. Plants in this genus are notably resistant to honey fungus[200].

5.2.118 *Carya tomentosa*

Mockernut, White Heart Hickory, Mockernut Hickory
 4 tin 9 cyuc 3 ckak 0 tcan 1 dwat 30 m hkuc
 htut cytuli kyuctcup hwicli hyishrasjltunyk hpa7tli flatprikklwis hpa7tmwatli fyif hjonli
 drutta *Carya tomentosa* is a deciduous Tree growing to 30 m (98ft 5in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in leaf from June to November, in flower in June, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: Sap Seed Edible Uses: Seed - raw or cooked[1, 43, 101, 159]. A delicious sweet taste but the thick, hard shell makes extraction very difficult[2, 183, 226]. The kernel is quite small considering the size of the nut[226]. Even squirrels leave the seed to accumulate under trees[117, 183]. The seed can be up to 6cm long[229]. The seed ripens in late autumn and, when stored in its shell in a cool place, will keep for at least 6 months[K]. Sap - used as a drink. Tapped in spring, it has a sweet flavour[101].

tcanta Dye Fuel Repellent Wood A black dye is obtained by boiling the bark in a vinegar solution[229]. A beige dye is extracted from the leaves and twigs, cream of tartar is required as a mordant[226]. A yellow dye is obtained from the bark when alum is used as a mordant[226]. The inner bark has been used to finish baskets and to make chair bottoms[257]. The leaves have been scattered about to repel insects[257]. Wood - close-grained, tough, elastic, very heavy, hard[61, 82, 227, 229]. It weighs 51lb per cubic foot[227]. The wood has excellent bending qualities and can withstand compression better than most other woods[229]. One of the best hickory woods, it is an important commercial timber and is used for vehicle parts, tool handles, fuel etc[61, 63, 82, 227, 229].

dwatta Astringent Detergent The inner bark is astringent and detergent[257]. It has been used as a dressing for cuts and has also been chewed to treat sore mouths[257].

nrakta Eastern N. America - Massachusetts to Ontario, south to Florida and Texas. ksacta Mainly along ridges, dry hills and hillsides, growing best in rich well-drained soils[229].

propta Seed - requires a period of cold stratification. It is best sown in a cold frame as soon as it is ripe[78]. Stored seed should be kept moist (but not wet) prior to sowing and should be sown in a cold frame as soon as possible[78]. Where possible, sow 1 or 2 seeds only in each deep pot and thin to the best seedling. If you need to transplant the seedlings, then do this as soon as they are large enough to handle, once more using deep pots to accommodate the tap root. Put the plants into their permanent positions as soon as possible, preferably in their first summer, and give them some protection from the cold for at least the first winter[78, K]. Seed can also be sown in situ so long as protection is given from mice etc and the seed is given some protection from cold[200] (a plastic bottle with the top and bottom removed and a wire mesh top fitted to keep the mice out is ideal)

nwatta Landscape Uses: Aggressive surface roots possible. Prefers a deep moisture-retentive loam in a sunny sheltered position, requiring a good summer for best development[1, 63, 137, 200]. Succeeds in poor soils[63] and in drier soils than many other members of the genus[200]. Generally a slow growing tree[200] though it is fast when young[149]. Trees respond well to coppicing[149]. A very ornamental and long-lived tree[1, 227], it is quite successful in Britain[137] and has been planted on an experimental scale for its timber in Germany[50]. Most species in this genus have quite a wide range of distribution and, in order to find trees more suited to this country, seed from the most appropriate provenances should be sought[137]. Most trees growing in Britain at present tend to only produce good seed after hot summers[137]. Trees in the wild commence fruiting when about 20 years old, with an optimum seed bearing age from 40 - 150 years, though they often live for 300 - 500 years[229]. Trees are self-fertile but larger crops of better quality seeds are produced if cross-pollination takes place[229]. Plants are strongly tap-rooted and should be planted in their permanent positions as soon as possible[1, 137]. Sowing in situ would be the best method so long as the seed could be protected from mice[1, 200]. Trees are late coming into leaf (usually late May to June)[137], but lose their leaves later in the autumn than other *Carya* species[229]. During this time they cast a heavy shade. These factors combine to make the trees eminently suitable for a mixed woodland planting with shrubs and other trees beneath them[137]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: North American native, Attractive flowers or blooms.

5.2.119 *Carya ovata*

Shagbark Hickory
 4 tin 8 cyuc 3 ckak 4 tcan 1 dwat 30 m hkuc
 htut cytuli kyuctcup hwicli hrasjltunyk hpa7tli flatprikklwis hpa7tmwatli fyif hjonli

drutta *Carya ovata* is a deciduous Tree growing to 30 m (98ft) by 15 m (49ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in leaf from June to October, in flower in June, and the seeds ripen from October to November. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: Sap Seed Edible Uses: Milk Seed - raw or cooked and used in pies, cakes, bread etc[2, 4, 61, 62, 183]. Sweet and delicious[1, 117, 183]. The seed can be ground into a meal and used to thicken soups etc[183]. A nut milk can be prepared from the seed and this is used as a butter on bread, vegetables etc[183]. The shell is normally thick and hard[101] but in selected cultivars it can be thin[159]. The seed ripens in late autumn and can be stored for up to 2 years in a cool cellar[117]. The seed is up to 4cm long[229]. Sap - sweet[257]. It is tapped in spring[101] and can be made into a syrup[226].

tcanta Dye Fuel Wood A yellow dye is obtained from the inner bark[226]. Wood - close-grained, tough, elastic, heavy and very hard. It weighs 52lb per cubic foot[227]. An excellent quality wood, it is used for tool handles, wheel spokes, sporting goods, baskets etc[46, 61, 63, 82, 227, 229]. The wood is an excellent fuel, burning well and giving off a lot of heat[229]. It produces an excellent charcoal[229]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Analgesic Antirheumatic The fresh small shoots have been steamed to make an inhalant for treating headaches[257]. A decoction of the bark has been taken internally to treat rheumatism and also used as a poultice on rheumatic joints[257].

nrakta Eastern N. America - Quebec to Ontario, south to Florida, Kansas and Texas. ksacta Dry upland slopes, rich deep moist soils and well drained soils of lowland and valleys[43, 62, 82].

propta Seed - requires a period of cold stratification. It is best sown in a cold frame as soon as it is ripe[78].

for later use[161, 177]. The fruit is up to 11mm in diameter and is borne in small clusters[K]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic Hypotensive Although no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta Western N. America - British Columbia to California, east to Idaho and Oregon. ksacta Meadows and near streams in California[71].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. This species is closely related to *C. douglasii*[71].

5.2.167 *Crataegus anomala*

Arnold hawthorn
 4 tin 8 cyuc 3 ckak 3 tcan 2 dwat 5 m hkuc
 hmimhtut cytuli hgattcuphja7n hwicli hrasjltunykfrp hpa7tli flatprikklwis hpa7tmwatli xre7t hjonli

drutta *Crataegus anomala* is a deciduous Shrub growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: Fruit Edible Uses: Fruit - raw or cooked[105, 177, 235]. Juicy[43]. A very nice flavour, it makes a very good dessert fruit[K]. The fruit can also be used in making pies, preserves, etc. and can be dried for later use. The fruit is up to 20mm in diameter with a thick flesh[235]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic Hypotensive Although no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta Eastern N. America - Quebec to New York. ksacta Rocky banks and open woods on low limestone ridges[43, 82].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. This species is growing in a number of botanical gardens in Britain, where it is fruiting very well[K]. Some botanists do not recognise it as a distinct species and place it as part of *C. pedicellata*[82]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

5.2.168 *Quercus gambelii*

Shin Oak, Gambel oak, Rocky Mountain White Oak
 4 tin 8 cyuc 3 ckak 3 tcan 2 dwat 4.5 m hkuc
 hmimhtut cytuli kyuctcup hwicli jltunyk hpa7tli flatprikklwis hpa7tmwatli hjonli

drutta *Quercus gambelii* is a deciduous Shrub growing to 4.5 m (14ft 9in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in May, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated

above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from May to June, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitability pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: Flowers Leaves Seed**Edible Uses:** Flowers - cooked[2, 105, 183]. They are usually boiled[179]. Leaves - cooked[2, 105, 183]. They are usually boiled[179]. Seed - cooked[2, 105, 177]. The seed is about the size of a pea, it is quite sweet[183], with a taste like a sweet chestnut[178]. The seed is husked and then ground into a powder and boiled[179].

nrrakta E. Asia - N. China. ksacta Thickets in drier areas, usually on shaded slopes.

propta Seed - 3 months cool stratification improves germination rates[113] so the seed is probably best sown in a cold frame in the autumn[K]. Another report says that the seed can be sown in a warm greenhouse in February or March[78], probably after stratification[K]. When large enough to handle, prick the seedlings out into individual pots. Grow the on in a lightly shaded position in a greenhouse for their first winter then plant them out into their permanent positions in late spring or early summer. Consider giving them some protection from winter cold for their first winter or two outdoors. Root cuttings, 3cm long planted horizontally in pots in a frame in December or January. Good percentage[78]. Division of suckers in the dormant season[200]. They can be planted out straight into their permanent positions.

nwatta Management: Standard Other Systems: Strip intercrop Regional Crop Staple Crop: Protein-oilPrefers a good loamy soil[1], but succeeds in most well-drained fertile soils in a sunny position[184, 200]. Prefers a warm dry situation[184]. Requires protection from cold winds[202]. Dormant plants are hardy to about -20°C[184]. They grow best in areas with warm summers and dry springs without late frosts[184], the young growth can be damaged by late spring frosts[1, 11]. They require summer heat in order to fully ripen their wood and to stimulate the production of flower buds[11, 200]. They are subject to attacks by 'coral spot' fungus, particularly if the wood is not fully ripened and is then damaged by winter cold[11]. Flowers are produced on the previous year's wood[202]. Plants are usually slow to become established[202]. **Special Features:**Not North American native, Fragrant flowers, Blooms are very showy. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2].

5.2.165 Crataegus flabellata

Fanleaf hawthorn

4 tlin 8 cyuc 3 kcaak 3 tcan 2 dwat 6 m hkuc
hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrp hpa7tli
flatprikwswisslip hpa7tmwatli xre7t hjonli

drutta Crataegus flabellata is a deciduous Shrub growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitability pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: Fruit**Edible Uses:** Fruit - raw or cooked. A sweet but very soft and mealy flesh, it makes an acceptable dessert fruit[K]. The fruit can be used in making pies, preserves, etc, and can also be dried for later use. The fruit is up to 15mm long and 8mm wide, it is borne in small clusters[82, 229]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrrakta Eastern N. America - Quebec to South Carolina, west to Louisiana. ksacta Thickets and open woods[204]. Dry open places, borders of woods and the margins of high banks of streams[82].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. A tree at Kew in September 1993 was fruiting heavily[K].

5.2.166 Crataegus columbiana

Columbian Hawthorn

4 tlin 8 cyuc 3 kcaak 0 tcan 2 dwat 5 m hkuc
hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrp hpa7tli
flatprikwswisslip hpa7tmwatli xre7t hjonli

drutta Crataegus columbiana is a deciduous Tree growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitability pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: Fruit**Edible Uses:** Fruit - raw or cooked[161, 166]. A very pleasant flavour, it is slightly mealy but juicy and can be eaten in quantity as a dessert fruit[K]. It is also used in making pies, preserves etc and can be dried

Stored seed should be kept moist (but not wet) prior to sowing and should be sown in a cold frame as soon as possible[78]. Where possible, sow 1 or 2 seeds only in each deep pot and thin to the best seedling. If you need to transplant the seedlings, then do this as soon as they are large enough to handle, once more using deep pots to accommodate the tap root. Put the plants into their permanent positions as soon as possible, preferably in their first summer, and give them some protection from the cold for at least the first winter[78, K]. Seed can also be sown in situ so long as protection is given from mice etc and the seed is given some protection from cold[200] (a plastic bottle with the top and bottom removed and a wire mesh pot fitted to keep the mice out is ideal)

nwatta Management: Standard Regional Crop Staple Crop: OilLandscape Uses:Firewood, Pest tolerant, Aggressive surface roots possible, Specimen. Prefers a deep moisture-retentive loam in a sunny sheltered position, requiring a good summer for best development[1, 63, 137, 200]. Succeeds in drier soils than most members of this genus[200]. Slow growing[200]. A very ornamental but slow-growing tree[1, 11, 227], it grows well in Britain, especially when young[11, 137], and does well in Cornwall[59]. The tree has a loose grey bark that comes away in broad flakes and gives the tree its common name[11]. The shagbark hickory is occasionally cultivated for its edible seed, there are some named varieties[183]. It tends to be low-yielding[117] and is said to be of no value in Britain as a commercial nut crop[11]. Trees take 15 years to come into flower from seed[117]. This species is the fastest growing hickory in N. America, it can fruit in ten years from seed[137]. Recommended cultivars (these are often hybrids with *C. cathayensis* or *C. laciniosa*) include:- Shagbarks - 'J Yoder No. 1', heavy cropping and early[200]. 'Porter'. 'Weschcke', a very thin shelled and regular cropper[200]. 'Wilcox', an excellent producer[200]. Shellbarks (these are more likely to be hybrids with *C. laciniosa*) - 'Fayette', thin shelled[200]. 'Henry', a very large nut[200]. Cultivated as a timber tree in C. Europe[50]. Plants are strongly tap-rooted and should be planted in their permanent positions as soon as possible[1, 137]. Sowing in situ would be the best method so long as the seed could be protected from mice[1, 200]. Trees are late coming into leaf (usually late May to June) and lose their leaves early in the autumn (usually in October)[137]. During this time they cast a heavy shade. These factors combine to make the trees eminently suitable for a mixed woodland planting with shrubs and other trees beneath them[137]. Plants in this genus are notably resistant to honey fungus[200]. Most species in this genus have quite a wide range of distribution and, in order to find trees more suited to this country, seed from the most appropriate provenances should be sought[137]. Most trees growing in Britain at present tend to only produce good seed after hot summers[137]. Trees are self-fertile but larger crops of better quality seeds are produced if cross-pollination takes place[229]. The leaves are aromatic[245]. **Special Features:**North American native, Attractive flowers or blooms. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

5.2.120 Juglans nigra

Black Walnut

4 tlin 9 cyuc 3 kcaak 4 tcan 3 dwat 30 m hkuc
hntur cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikwswisslip hpa7tmwatli fyf hjonli

drutta Juglans nigra is a deciduous Tree growing to 30

m (98ft) by 20 m (65ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from May to June, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitability pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista The plant has occasionally been known to cause contact dermatitis in humans[274].

kcakta Edible Parts: Oil Sap Seed**Edible Uses:** Oil SweetenerSeed - raw or cooked. A sweet, rich distinctive delicious flavour it makes an excellent dessert nut and is also widely used in confections, cakes etc[2, 34, 82, 183]. The kernel is hard to extract and the oil it contains quickly turns rancid[101, 159]. The unripe fruits can be pickled[183]. The seed is borne in solitary fruits or in pairs and is 3 - 4cm in diameter[82, 229]. The nuts can leave a permanent stain on clothing[226]. An edible oil is obtained from the seed[101, 183]. A sweet taste but it tends to go rancid quickly[159]. Used as a seasoning in bread, squash and other foods[183]. The tree yields a sweet sap that can be drunk or concentrated into syrup or sugar[101, 102, 183]. It is tapped in spring.

tcanta Beads Compost Dye Filter Herbicide Insecticide Oil **Repellent Tannin Wood**A brown dye is obtained from the nuts, husks and bark[14, 57, 101, 159]. It does not require a mordant[169]. The husks can be dried for later use[169]. A brown dye is obtained from the leaves and stems[168]. It does not require a mordant[168]. The dye turns black if it is prepared in an iron pot[168]. The leaves can be dried for later use[169]. The husks are rich in tannin[226]. The green fruit husks can be boiled to provide a yellow dye[269]. The husks can be made into a high quality coal (does the report mean charcoal?[K]) and is then used as a filter[226]. It was used in gas masks[226]. The woody shells on the fruits have been used to make jewellery[269]. Insects are said to avoid the walnut tree, hence it is often used as a poor man's insect repellent. When rubbed on faces, walnut leaves are said to repel flies[269]. The leaves repel fleas and have been used as a strewing herb[20, 201, 257]. They are also used as an insecticide against bed bugs[222]. The ground up husks are also insecticidal[226]. The leaves produce substances that depress the growth of other plants. These substances are washed onto the ground by rain and inhibit the growth of plants beneath the tree[18, 20, 159]. The roots also produce substances that are toxic to many plant species, especially apples (*Malus* species), members of the Ericaceae, *Potentilla* spp and the white pines (certain *Pinus* spp.)[200]. An alternative ingredient of 'QR' herbal compost activator[32]. This is a dried and powdered mixture of several herbs that can be added to a compost heap in order to speed up bacterial activity and thus shorten the time needed to make the compost[K]. Wood - very ornamental, heavy, hard, strong, close-grained, very durable. Easily worked, it glues well, does not warp, shrink or swell much and takes a good polish. It weighs 38lb per cubic foot. A very valuable timber tree and possibly the most sought after wood in N. America, it is used in cabinet making, the interior finishes of houses, furniture, airplanes, ship building, veneer etc[1, 46, 61, 82, 101, 149, 227, 229, 235, 269]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Alterative Anodyne AntiInflammatory Astringent Blood purifier Detergent Ectima Laxative Leprosy Pectoral VermifugeThe bark and leaves are alterative, anodyne, astringent, blood tonic, detergent, emetic, laxative, pectoral and vermifuge[4, 222, 257]. Especially useful in the treatment of skin diseases, black walnut is of the highest value in curing scrofulous diseases, herpes, eczema etc[4]. An infusion of the bark is used to treat diarrhoea and also to stop the production of milk, though a strong infusion can be emetic[21, 257]. The bark is chewed to allay the pain of toothache and it is also used as a poultice to reduce the pain of headaches[222, 257]. The juice from the fruit husk is applied externally as a treatment for ringworm[222, 257]. The husk is chewed in the treatment of colic and applied as a poultice to inflammations[222]. The burnt kernels, taken in red wine, are said to prevent falling hair, making it fair[269]. Green husks are supposed to ease the pain of toothache[269]. A tea made from the leaves is astringent[222]. An infu-

sion has been used to lower high blood pressure[257]. It can be used as a cleansing wash[21]. The pulverized leaves have been rubbed on the affected parts of the body to destroy ringworm[257]. The oil from the ripe seeds has been used externally in the treatment of gangrene, leprosy, and wounds[269]. The sap has been used to treat inflammations[257].

nrakta Eastern N. America - Massachusetts to Florida, west to Texas and Minnesota. ksacta Rich fertile woods and hillsides[43, 82] in deep well-drained soils[229].

propta The seed is best sown as soon as it is ripe in individual deep pots in a cold frame[80]. You need to protect it from mice, birds, squirrels etc. The seed usually germinates in late winter or the spring. Plant out the seedlings into their permanent positions in early summer and give some protection from the cold for their first winter or two. The seed can also be stored in cool moist conditions (such s the salad compartment of a fridge) over the winter and sown in early spring but it may then require a period of cold stratification before it will germinate[78, 80, 113].

nwatta Industrial Crop: Dye Management: Standard Other Systems: Strip intercrop Regional Crop Staple Crop: Protein-oilLandscape Uses:Firewood, Aggressive surface roots possible, Specimen. Requires a deep well-drained loam and a sunny position sheltered from strong winds[1, 11]. Prefers a slightly alkaline soil[200]. Plants are best suited to deep, rich, slightly acid or neutral soil, with good drainage, but will not succeed on infertile upland soil or on soils with poor drainage[269]. The black walnut grows best areas with an annual precipitation from 30 to 130cm, an annual temperature in the range of 7 to 19°C and a pH from 4.9-8.2[269]. The dormant plant is very cold hardy, but the young growth in spring, however, can be damaged by late frosts. The Black walnut is one of most valuable natural forest trees in the United States[269]. A very ornamental and fast growing plant[1, 200], it is sometimes cultivated in N. America for its edible seed. Whilst potential yields of 7.5 tonnes per hectare have been postulated, it is more feasible to expect annual yields of around 2.5 tonnes per hectare[269]. Good seed crops are usually produced every other year, though some plants fruit well annually whilst others produce good crops every third year[269]. The average weight of a seed from wild trees is about 17g, though there are many named varieties and the weight of their seeds varies from 20 - 30g[183, 269]. There are breeding programmes that are seeking to develop cultivars with thinner shells[226]. Trees in the wild commence bearing seeds when about 12 years old[227]. Black walnut trees mature their fruit rather generally throughout the plants natural range where there is a growing season of about 150 days and an average summer temperature of 16.5°C[269]. Trees do not fruit very freely in Britain unfortunately[1, 11]. They grow well in the eastern half of the country but often do not thrive in the west[98]. Trees have been extensively planted for timber in parts of C. and E. Europe[50]. This species hybridizes with *J. regia*[149], some named cultivars have been developed from this cross for their seed. Plants produce a deep taproot which makes them very drought resistant when established, though they are intolerant of root disturbance[1, 11, 269]. Seedlings should be planted out into their permanent positions as soon as possible and given some protection for their first winter or two since they are somewhat tender when young[1, 11]. Flower initiation depends upon suitable conditions in the previous summer[200]. The flowers and young growths can be destroyed by even short periods down to -2°C, but fortunately plants are usually late coming into leaf[200]. The black walnut is self-fertile, but the sequence of male and female blooming, called dichogamy, can and often does minimize chances of a tree shedding pollen on its own pistils. In different trees pollen may be shed before the receptivity period of female flowers, or at same time, or after pistil receptivity. For greatest possible nut production, plant trees of 2 or more cvs, as different cvs have overlapping pollen-receptivity periods and can pollinate each other[269]. Any pruning should only be carried out in late summer to early autumn or when the plant is fully dormant otherwise wounds will bleed profusely and this will severely weaken the tree[200]. Plants produce chemicals which can inhibit the growth of other plants. These chemicals are dissolved out of the leaves when it rains and are washed down to the ground below, reducing the growth of plants under the tree[18, 20, 159]. The roots also produce substances that are toxic to many plant species, es-

pecially apples (*Malus* species), members of the Ericaceae, *Potentilla* spp and the white pines (certain *Pinus* spp.)[200]. Beans, peas and tomatoes are also particularly sensitive to these secretions and will not grow in the rooting zone[200]. Trees cast quite a dense shade so, along with their other anti-social tendencies, are not very friendly trees for a woodland garden[K]. The bruised leaves have a pleasant sweet though resinous smell[245]. Special Features: Attracts birds, North American native, Inconspicuous flowers or blooms. The plant is heat tolerant in zones 9 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

5.2.121 *Carya cordiformis*

Bitternut, Bitternut hickory, Swamp Hickory
4 tlin 9 cyuc 3 kcaak 0 tcan 1 dwat 25 m hkuc
htuc cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliws hpa7tmwatli fyif hjonli

drutta *Carya cordiformis* is a deciduous Tree growing to 25 m (82ft) by 15 m (49ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in leaf from June to October; in flower from April to May, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kckahta Edible Parts: Oil SeedEdible Uses: OilSeed - raw or cooked[161, 177]. Thin shelled but bitter and astringent[82, 183]. Even squirrels tend to pass it over[226]. The seed is about 3cm long[229]. The seed ripens in late autumn and, when stored in its shell in a cool place, will keep for at least 6 months[K].

tcanta Fuel Oil Rootstock WoodAn oil expressed from the seeds has been used as an illuminant in oil lamps[229]. Often used as a potted stock for grafting varieties of pecans (*C. illinoensis*) [227]. Wood - heavy, very hard, strong, elastic, tough, close grained[82, 227, 229]. It weighs 47lb per cubic foot[227]. Although the wood tends to be brittle, it has an amazing quality of shock-resistance and is used for hoops, tool handles etc, though it is considered to be inferior to other hickories[82, 227, 229]. A very good fuel, burning well and giving off a lot of heat[229].

dwatta Antirheumatic Diuretic LaxativeThe oil from the seeds has been used in the treatment of rheumatism[226]. The bark is diuretic and laxative[257].

nrakta Eastern N. America - Maine to Quebec and south to Florida. ksacta Low wet to dry woods, stream banks and borders of swamps[43, 82], tolerating a range of soils[229].

propta Seed - requires a period of cold stratification. It is best sown in a cold frame as soon as it is ripe[78]. Stored seed should be kept moist (but not wet) prior to sowing and should be sown in a cold frame as soon as possible[78]. Where possible, sow 1 or 2 seeds only in each deep pot and thin to the best seedling. If you need to transplant the seedlings, then do this as soon as they are large enough to handle, once more using deep pots to accommodate the tap root. Put the plants into their permanent positions as soon as possible, preferably in their first summer, and give them some protection from the cold for at least their first winter[78, K]. Seed can also be sown in situ so long as protection is given from mice etc and the seed is given some protection from cold[200] (a plastic bottle with the top and bottom removed and a wire mesh top fitted to keep the mice out is ideal)

undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Hybridizes freely with other members of this genus[200]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

5.2.163 *Crataegus laevigata*

Midland Hawthorn, Smooth hawthorn, English Hawthorn
4 tlin 8 cyuc 3 kcaak 5 tcan 5 dwat 6 m hkuc
pcimhimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrp hpa7tli flatprikliwsslip hpa7tmwatli xre7t hjonli

drutta *Crataegus laevigata* is a deciduous Shrub growing to 6 m (19ft) by 6 m (19ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to May, and the seeds ripen from September to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kckahta Edible Parts: Fruit LeavesEdible Uses: Coffee TeaFruit - raw or cooked[2, 9, 12, 183]. A dry and mealy texture, they are not very appetizing[K]. The fruit can be used for jams and preserves[9]. The fruit pulp can be dried, ground into a meal and mixed with flour in making bread etc[46, 183]. The fruit is about 1cm in diameter[200]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K]. Young leaves and young shoots - raw[5, 177]. A tasty nibble, they are nice in a salad[K]. Young leaves are a tea substitute[21, 46, 177, 183]. The roasted seed is a coffee substitute[12, 21, 183].

tcanta Charcoal Fuel Hedge Hedge Rootstock WoodA good hedge plant, it is very tolerant of neglect and is able to regenerate if cut back severely, it makes a good thorny stock-proof barrier[186] and resists very strong winds. It can be used in layered hedges[11, 29]. The plant is often used as a rootstock for several species of garden fruit such as the medlar (*Mespilus germanica*) and the pear (*Pyrus communis sativa*)[4]. Wood - very hard and tough but difficult to work[7, 46, 61]. It has a fine grain and takes a beautiful polish but is seldom large enough to be of great value[4]. It is used for tool handles and making small wooden articles etc[4, 7, 46, 61]. The wood is valued in turning and makes an excellent fuel, giving out a lot of heat, more so even than oak wood[4]. Charcoal made from the wood is said to be able to melt pig iron without the aid of a blast[4].

dwatta Antiarrhythmic Antispasmodic Astringent Cardiotonic Diuretic Hypotensive Malaria Sedative Tonic VasodilatorHawthorn is an extremely valuable medicinal herb. It is used mainly for treating disorders of the heart and circulation system, especially angina[254]. Western herbalists consider it a 'food for the heart', it increases the blood flow to the heart muscles and restores normal heart beat[254]. This effect is brought about by the presence of bioflavonoids in the fruit, these bioflavonoids are also strongly antioxidant, helping to prevent or reduce degeneration of the blood vessels[254]. The fruit is antispasmodic, cardiac, diuretic, sedative, tonic and vasodilator[4, 9, 21, 46, 165]. Both the

fruits and flowers of hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222], they are also used to treat a heart muscle weakened by age, for inflammation of the heart muscle, arteriosclerosis and for nervous heart problems[21]. Prolonged use is necessary for the treatment to be efficacious[222]. It is normally used either as a tea or a tincture[222]. Hawthorn is combined with ginkgo (*Ginkgo biloba*) to enhance poor memory, working by improving the blood supply to the brain[254]. The bark is astringent and has been used in the treatment of malaria and other fevers[7]. The roots are said to stimulate the arteries of the heart[218].

nrakta Europe, including Britain, from Sweden to Spain, eastwards to Poland. ksacta Woods, hedges, thickets etc on clays and heavy loams, especially in E. Britain[17, 186]. Where found in hedges it is often as a relic of ancient woodland[186].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta Landscape Uses:Border, Espalier, Pollard, Specimen, Street tree. A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. A true woodland species, it grows well in quite dense shade[17, 186]. A very hardy plant, tolerating temperatures down to at least -18°C[202]. Hybridizes freely with other members of this genus[200]. Closely allied to *C. monogyna*, it often hybridizes with that species in the wild when growing in its proximity[186]. There are many named forms selected for their ornamental value[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. An important food plant for the larvae of many lepidoptera species[30]. Special Features:Not North American native, Blooms are very showy.

5.2.164 *Xanthoceras sorbifolium*

Yellowhorn
4 tlin 7 cyuc 3 kcaak 0 tcan 0 dwat 6 m hkuc
htuc cyutli kyucup hwicli hrasjlutnyik hpa7tli flatprikliws hpa7tmwatli xre7t hjonli

drutta *Xanthoceras sorbifolium* is a deciduous Shrub growing to 6 m (19ft) by 2.5 m (8ft) at a slow rate. See

will often flower heavily in their third year[K]. A ten year old tree was seen at Kew Gardens in 2002. It was about 2.5 metres tall and was bearing a very good crop of fruit[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Hybridizes freely with other members of this genus[200]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

5.2.161 Crataegus rotundifolia

4 tlin 8 cyuc 3 kcaok 0 tcan 2 dwat 6 m hkuu
hmmihhut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatprikwlissip hpa7tmwatli xre7t hjonli

drutta Crataegus rotundifolia is a deciduous Tree growing to 6 m (19ft) by 4 m (13ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in June, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

ckaakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. A fair size fruit, to 15mm in diameter, with a reasonable sweet meaty taste, though when not fully ripe there is a distinct bitterness[K]. It makes an acceptable dessert fruit[K]. The fruit can be used in making pies, preserves, etc, and can also be dried for later use. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta Eastern N. America. ksacta Not known

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit,

they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. A tree bearing this name at Kew in September 1993 was fruiting abundantly[K]. There is some confusion over the correct name of this species. *C. rotundifolia* Moench. is said to be a synonym for *C. chrysoarpa* phoenicea, *C. rotundifolia* Borckh. is a synonym of *C. chrysoarpa*. There is also a *C. rotundifolia* Lam, which is a synonym of *Amelanchier rotundifolia*[200].

5.2.162 Crataegus coccinoides

Kansas Hawthorn

4 tlin 8 cyuc 3 kcaok 0 tcan 2 dwat 6 m hkuu
hmmihhut cyutli hgatkuyctcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatprikwlissip hpa7tmwatli xre7t hjonli

drutta Crataegus coccinoides is a deciduous Tree growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

ckaakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 177]. Firm and sub-acid[82]. The fruit can be used in making pies, preserves, etc, and can also be dried for later use. The fruit is borne in small clusters and is up to 17mm in diameter[229]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta Central N. America - Illinois and Missouri take Kansas, Oklahoma and Arkansas. ksacta Dry thickets and calcareous hills[43].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but

nwatta Landscape Uses:Pest tolerant, Aggressive surface roots possible. Prefers a deep moisture-retentive loam in a sunny sheltered position, requiring a good summer for best development[1, 63, 137, 200]. Slow growing[200]. This is the hardiest and best growing member of this genus in Britain[11], unfortunately the seed is bitter[82]. Hybridizes in the wild with *C. illinoensis*[43]. Hybridizes with other members of this genus[200]. Plants are strongly tap-rooted and should be planted in their permanent positions as soon as possible[1, 137]. Sowing in situ would be the best method so long as the seed could be protected from mice[1, 200]. Trees are late coming into leaf (usually late May to June) and lose their leaves early in the autumn (usually in October)[137]. During this time they cast a heavy shade. These factors combine to make the trees eminently suitable for a mixed woodland planting with shrubs and other trees beneath them[137]. Plants in this genus are notably resistant to honey fungus[200]. Most species in this genus have quite a wide range of distribution and, in order to find trees more suited to this country, seed from the most appropriate provenances should be sought[137]. Most trees growing in Britain at present tend to only produce good seed after hot summers[137]. Trees are self-fertile but larger crops of better quality seeds are produced if cross-pollination takes place[229]. Special Features:North American native, Wetlands plant, Inconspicuous flowers or blooms.

5.2.122 Quercus palustris

Pin Oak, Swamp Oak

4 tlin 8 cyuc 3 kcaok 0 tcan 2 dwat 25 m hkuu
hmmihhut cyutli tcup hwicli jlutnyik hpa7tli flatprikwlissip hpa7tmwatli hjonli

drutta Quercus palustris is a deciduous Tree growing to 25 m (82ft) by 8 m (26ft) at a fast rate. It is in flower from April to May, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

ckaakta Edible Parts: SeedEdible Uses: CoffeeSeed - cooked[159]. The seed is about 15mm long[200], it can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed contains bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker: A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute.

tcanta Ink Repellent Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. A black ink is made from the galls[226]. Wood - strong, hard, coarse grained, heavy, often knotty owing to the persistence of many small limbs[46, 61, 82, 171, 227]. It weighs 43lb per cubic foot[227]. It is occasionally used for shingles, clap-boards, furniture, wooden nails etc and as a fuel[46, 61, 82, 171, 227, 229].

dwatta Astringent Dysentery StomachicAn infusion of the inner bark has been used to treat intestinal pains[257]. Any galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta North-eastern and Central N. America - Massachusetts to Michigan, Virginia and Arkansas. ksacta Deep

rich soils[227, 229] in swampy woods and bottoms at low elevations[43]. Often found in wet, poorly drained claypan soils typical of floodplains, tolerating short periods of spring flooding[229].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Average germination rate is about 68%[227]. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Landscape Uses:Aggressive surface roots possible, Specimen, Street tree. Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Lime tolerant[188]. Young plants tolerate reasonable levels of side shade[200]. Withstands atmospheric pollution[227]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. A fairly fast growing tree[200], it is occasionally cultivated for timber in eastern central Europe[50]. It coppices fairly well[227]. The tree seldom lives longer than 150 - 200 years in the wild, commencing to bear seeds when 15 - 25 years old[229]. Seed production is cyclic, a year of high yields being followed by 2 - 3 years of low yields[229]. The tree flowers on new growth produced in spring, the seed taking two summers to ripen[229]. There are some named varieties selected for their ornamental value[200]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. This species has a relatively shallow tap-root, making it easier to transplant[226]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: Attracts birds, North American native, Inconspicuous flowers or blooms.

5.2.123 Tilia tomentosa

Silver Lime

4 tlin 7 cyuc 3 kcaok 2 tcan 1 dwat 25 m hkuu
hmmihhut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatprikwlissip hpa7tmwatli xre7t hjonli

drutta Tilia tomentosa is a deciduous Tree growing to 25 m (82ft) by 20 m (65ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista The flowers are toxic to bumble bees[11].

ckaakta Edible Parts: LeavesEdible Uses: Condiment TeaYoung leaves - raw or cooked[179]. The dried leaves are sometimes used as an adulterant for marjoram (*Origanum majorana*) [183]. A tea can be made from the flowers. A very good chocolate substitute is made from a paste of the ground fruits and flowers[2]. Trials on marketing the product failed because the paste decomposes readily[2].

tcanta FibreA fibre is obtained from the tough inner bark. It can be made into diverse items such as mats, shoes and coarse cloth[229].

dwatta Antispasmodic Diaphoretic SedativeA tea made from the flowers is antispasmodic, diaphoretic and sedative[226].

nrakta S.E. Europe. ksacta Oak and mixed woods[74].

propta Seed - much of the seed produced in Britain is not viable, cut a few seedcases open to see if there is a seed inside[80]. If possible, obtain fresh seed that is ripe but has not as yet developed a hard seed coat and sow it immediately in a cold frame. It may germinate in the following spring though it could take 18 months[80]. Stored seed can be very slow to germinate. It has a hard seed coat, embryo dormancy and a hard coat on the pericarp. All these factors mean that the seed may take up to 8 years to germinate[80]. One way of shortening this time is to stratify the seed for 5 months at high temperatures (10°C at night, up to 30°C by day) and then 5 months cold stratification[80]. When they are large

enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Layering in spring just before the leaves unfurl. Takes 1 - 3 years[78]. Suckers, when formed, can be removed with as much root as possible during the dormant season and replanted immediately[200].

nwatta Landscape Uses:Firewood, Pollard, Screen, Specimen, Street tree. Prefers a good moist loamy alkaline to neutral soil but succeeds on slightly acid soils[11, 200]. Grows poorly on any very dry or very wet soil[200]. According to another report this species succeeds in a hot dry position. Dislikes exposed positions[200]. Succeeds in sun or semi-shade[188]. This species thrives in southern England[11], though it prefers a continental climate, growing more slowly and not producing fertile seed in areas with cool summers[200]. Lime trees tend to hybridise freely if other members of the genus are growing nearby[238]. If growing plants from seed it is important to ensure the seed came from a wild source or from an isolated clump of the single species[K]. Grows best in a woodland situation, young plants tolerate a reasonable level of side shade[200]. The fragrant flowers of this tree are toxic to bees[188]. Trees are usually attacked by aphids which cover the ground and the leaves with a sticky honeydew[188]. Rarely produces suckers. Quite tolerant of root disturbance, semi-mature trees up to 5 metres tall have been transplanted successfully. Plants in this genus are notably resistant to honey fungus[200]. Special Features:Attracts birds, Attractive foliage, Not North American native, Fragrant flowers, Attractive flowers or blooms.

5.2.124 *Tilia chinensis*

4 tlin 8 cyuc 3 kcaak 0 tcan 1 dwat 25 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwsi hpa7tmwatli xre7t hjonli

drutta *Tilia chinensis* is a deciduous Tree growing to 25 m (82ft 0in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to July, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: TeaYoung leaves - raw[K]. A tea is made from the flowers. A very good chocolate substitute is made from a paste of the ground fruits and flowers[2]. Trials on marketing the product failed because the paste decomposes readily[2].

tcanta FibreA fibre is obtained from the inner bark and used for making sandals, nets etc[178].

dwatta Antispasmodic Diaphoretic SedativeA tea made from the flowers is antispasmodic, diaphoretic and sedative[226].

nrakta E. Asia - China. ksacta Woods in W. Szechwan, 2300 - 3000 metres[109].

propta Seed - much of the seed produced in Britain is not viable, cut a few seedcases open to see if there is a seed inside[80]. If possible, obtain fresh seed that is ripe but has not as yet developed a hard seed coat and sow it immediately in a cold frame. It may germinate in the following spring though it could take 18 months[80]. Stored seed can be very slow to germinate. It has a hard seed coat, embryo dormancy and a hard coat on the pericarp. All these factors mean that the seed may take up to 8 years to germinate[80]. One way of shortening this time is to stratify the seed for 5 months at high temperatures (10°C at night, up to 30°C by day) and then 5 months cold stratification[80]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Layering in spring just before the leaves unfurl. Takes 1 - 3 years[78]. Suckers, when formed, can be removed with as much root as possible during the dormant season and replanted immediately[200].

nwatta Prefers a good moist loamy alkaline to neutral soil but succeeds on slightly acid soils[11, 200]. Grows poorly on any very dry or very wet soil[200]. Dislikes exposed positions[200]. Succeeds in sun or semi-shade[188]. Grows best in a woodland situation, young plants tolerate a reasonable level of side shade[200]. Prefers a continental climate, growing more slowly and not producing fertile seed in areas with cool summers[200]. Lime trees tend to hybridise freely if other members of the genus are growing nearby[238]. If growing plants from seed it is important to ensure the seed came from a wild source or from an isolated clump of the single species[K]. Trees are usually attacked by aphids which cover the ground and the leaves with a sticky honeydew[188]. Closely related to *T. intonsa*[11]. Quite tolerant of root disturbance, semi-mature trees up to 5 metres tall have been transplanted successfully. Plants in this genus are notably resistant to honey fungus[200].

5.2.125 *Corylus colurna*

Turkish Hazel, Chinese hazelnut, Turkish Filbert, Turkish Hazel

4 tlin 7 cyuc 3 kcaak 3 tcan 1 dwat 20 m hkuc hmimhtut cyutli hqattcup hwicli hrasjlutnyik hpa7tli flatprikliwsi hpa7tmwatli fyif hjonli

drutta *Corylus colurna* is a deciduous Tree growing to 20 m (65ft) by 7 m (23ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to May, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure.

kcakta Edible Parts: Oil SeedEdible Uses: OilSeed - raw or cooked[2, 22, 46, 105]. Rich in oil. As nice a flavour as *C. avellana*, the common hazel nut[146, 158]. The seed ripens in mid to late autumn and will probably need to be protected from squirrels[K]. When kept in a cool place, and not shelled, the seed should store for at least 12 months[K]. An edible oil is obtained from the seed.

tcanta Oil WoodWood - firm, durable, moderately hard. Used for furniture, turnery etc[74, 158].

dwatta TonicThe seeds are tonic[240].

nrakta S.E. Europe to W. Asia. ksacta Shady mixed forests, 1000 - 1800 metres in E. Asia[74]. Found at altitudes up to 3000 metres in the Himalayas where it is found mainly on northerly aspects and in shady places[146, 158].

propta Seed - best sown as soon as it is harvested in autumn in a cold frame[164]. Germinates in late winter or spring. Stored seed should be pre-soaked in warm water for 48 hours and then given 2 weeks warm followed by 3 - 4 months cold stratification[164]. Germinates in 1 - 6 months at 20°C[164]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame or sheltered place outdoors for their first winter. Plant them out into their permanent positions in late spring or early summer[K]. Layering in autumn. Easy, it takes about 6 months[78, 200].

nwatta Management: Standard Regional Crop Staple Crop: Protein-oilLandscape Uses:Firewood, Specimen, Street tree. An easily grown plant, it succeeds in most soils, but is in general more productive of seeds when grown on soils of moderate fertility[11, 200]. It does less well in rich heavy soils or poor ones[11, 63]. Does well in a loamy soil[11]. Very suitable for an alkaline soil[11], but it dislikes very acid soils[17]. Tolerates a pH in the range 5.3 to 7.3. Once established, this is a very drought resistant tree[183]. It does not produce suckers[183]. Plants are fairly wind tolerant[1, 11]. A very ornamental tree[1]. Members of this genus bear transplanting well and can be easily moved even when relatively large[11]. The Turkish hazel is occasionally cultivated for its edible seed[46, 61, 158]. This species is also useful in hybridizing with *C. avellana* in order to develop superior fruiting cultivars[183]. Special Features:Not North American native, Inconspicuous flowers or blooms. The plant is heat tolerant in zones 7 through 5. (Plant Hardiness Zones

hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatprikliwsi hpa7tmwatli xre7t hjonli

drutta *Crataegus altaica* is a deciduous Tree growing to 6 m (19ft) by 4 m (13ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Fruit - raw or cooked. About 8mm in diameter, the fruit is yellow with a fairly dry mealy texture and a pleasantly sweet flesh[K]. The fruit can also be used in making pies, preserves, etc, and can also be dried for later use. The fruit ripens in August, making it one of the earliest ripening hawthorns[K]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Although no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta W. Asia - Altai Mountains. ksacta Not known

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. This species is closely related to *C. wattiana*[11]. Hawthorns in general hybridize freely with other members of the genus[200]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

5.2.160 *Crataegus chrysoarpa*

Fireberry Hawthorn, Red haw, Piper's hawthorn, 4 tlin 8 cyuc 3 kcaak 0 tcan 2 dwat 6 m hkuc hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatprikliwsi hpa7tmwatli xre7t hjonli

drutta *Crataegus chrysoarpa* is a deciduous Tree growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[161, 177]. Used mainly as a famine food[257]. A very pleasant flavour when ripe, with the added bonus of ripening in late summer before most other members of the genus[K]. The fruit can be used in making pies, preserves, etc, and can also be dried for later use. It is about 1cm in diameter and borne in small clusters[200]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K]. A tea can be made from the twigs[257]. (This probably means the young shoots with leaves[K].)

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic Hypotensive LaxativeA decoction of the dried berries has been used as a mild laxative[257]. A compound decoction of the root has been used in the treatment of diarrhoea[257]. Although no other specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta North-eastern N. America - Newfoundland to Pennsylvania, west to the Rocky Mountains. ksacta Thickets and rocky ground along streams[43].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees

(sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[K]. Up to 2cm long and pear shaped[11]. The fruit can be used in making pies, preserves, etc, and can also be dried for later use. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta Eastern N. America - New York. ksacta Not known

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Plants are hardy to at least -18°C[202]. This sub-species has larger fruits than the type[11]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

5.2.158 Crataegus pruinosa

Frosted Hawthorn, Waxyfruit hawthorn
4 tlin 8 cyuc 3 kcak 0 tcan 2 dwat 6 m hkuc
hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnykfrip hpa7tli flatprikliwsslip hpa7tmwatli xre7t hjonli

drutta Crataegus pruinosa is a deciduous Tree growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen in October. The species is

hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 161, 177]. The flesh is thick[82]. A sweet yellow flesh[200]. The fruit can be used in making pies, preserves, etc, and can also be dried for later use[257]. The fruit is about 1cm in diameter[200]. The fruit is up to 16mm in diameter with a thin flesh[229]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta North-eastern N. America - Newfoundland to North Carolina, west to Wisconsin and Oklahoma. ksacta Thickets and rocky ground[43] in open woods[235]. Slopes of low hills, often in limestone soils[82].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

5.2.159 Crataegus altaica

Altai Mountain Thorn
4 tlin 8 cyuc 3 kcak 0 tcan 2 dwat 6 m hkuc

show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The root growth habit is a standard with a non-suckering single trunk [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2].

5.2.126 Gleditsia triacanthos

Honey Locust

4 tlin 8 cyuc 3 kcak 2 tcan 2 dwat 20 m hkuc
htut cyutli hgatkuyctcup hwicli hyhisrasjlutnyk hpa7tli flatprikliwssom hpa7tmwatli xre7t hjonli

drutta Gleditsia triacanthos is a deciduous Tree growing to 20 m (65ft) by 15 m (49ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in July, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in saline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. It can tolerate atmospheric pollution.

pcista The plant contains potentially toxic compounds[222].

kcakta Edible Parts: Seed SeedpodEdible Uses: Coffee Drink Gum SweetenerSeed - raw or cooked. It can contain up to 30% sugar[160]. Young seeds taste like raw peas[183]. Seeds are not always borne in maritime regions because the tree prefers long hot summers[11]. The oval seeds are about 8mm long[227]. They contain 10.6 - 24.1% protein, 0.8 - 4.3% fat, 84.7% carbohydrate, 21.1% fibre, 4% ash, 280mg calcium and 320mg phosphorus per 100g[218]. The seeds have been roasted and used as a coffee substitute[269]. Seedpods - the pulp is sweet and can be eaten raw or made into sugar[149, 159, 183]. The tender young seedpods can be cooked and eaten[183]. The pulp in older pods turns bitter[227]. The seedpods are up to 40cm long and 4cm wide[227]. A sweet, pleasant tasting drink can be made from the seed pods[257]. The seed pulp has been used to make a drink[257].

tcanta Fodder Gum Soil reclamation Tannin Wood-Planted for land reclamation on mining waste[200]. The gum from the seeds has been suggested as an emulsifying substitute for acacia and tragacanth[269]. The heartwood contains 4 - 4.8% tannin[240]. Wood - strong, coarse-grained, elastic, very hard, very durable in contact with the soil, highly shock resistant[46, 61, 82, 149]. It does not shrink much but splits rather easily and does not glue well[227]. It weighs 42lb per cubic foot[227]. Largely used for making fence posts and rails, wheel hubs, farm implements etc and in construction[46, 61, 82, 149].

dwatta Anaesthetic Antiseptic Cancer StomachicThe pods have been made into a tea for the treatment of indigestion, measles, catarrh etc[222, 257]. The juice of the pods is antiseptic[222]. The pods have been seen as a good antidote for children's complaints[257]. The alcoholic extract of the fruits of the honey locust, after elimination of tannin, considerably retarded the growth, up to 63% of Ehrlich mouse carcinoma[269]. However, the cytotoxicity of the extract was quite high and the animals, besides losing weight, showed dystrophic changes in their liver and spleen[260]. The alcoholic extract of the fruit exerted moderate oncostatic activity against sarcoma 180 and Ehrlich carcinoma at the total dose 350 mg/kg/body weight/mouse. Weight loss was considerable[269]. An infusion of the bark has been drunk and used as a wash in the treatment of dyspepsia[257]. It has also been used in the treatment of whooping cough, measles, smallpox etc[257]. The twigs and the leaves contain the alkaloids gleditschine and stenocarpine[4]. Stenocarpine has been used as

a local anaesthetic whilst gleditschine causes stupor and loss of reflex activity[4]. Current research is examining the leaves as a potential source of anticancer compounds[222].

nrakta Eastern N. America. Occasionally naturalized in C. and S. Europe. ksacta Usually growing singly, though occasionally forming almost pure woods, on the borders of streams and in rich woods, usually in moist fertile soils but sometimes on dry sterile gravelly hills[43, 82].

propta Seed - pre-soak for 24 hours in warm water and then sow in spring in a greenhouse[78]. The seed should have swollen up, in which case it can be sown, if it has not swollen then soak it for another 24 hours in warm water. If this does not work then file away some of the seed coat but be careful not to damage the embryo[78]. Further soaking should then cause the seed to swell. One it has swollen, the seed should germinate within 2 - 4 weeks at 20°C. As soon as they are large enough to handle, prick the seedlings out into individual deep pots and plant them out into their permanent positions in the summer. Give the plants some protection from the cold for their first few winters outdoors.

nwatta Agroforestry Services: Living fence Fodder: Bank Fodder: Pod Industrial Crop: Biomass Management: Coppice Management: Standard Minor Global Crop Staple Crop: Balanced carbLandscape Uses:Aggressive surface roots possible, Specimen. Succeeds in most soils, acid or alkaline[160, 200], so long as they are well-drained[202]. Requires a sunny position[11]. Tolerates drought once established[1] and atmospheric pollution[200]. Salt tolerant[200]. The honey locust is speculated to tolerate an annual precipitation of 60 to 150cm, an annual temperature range of 10 to 21°C, and a pH in the range of 6 to 8[269]. Trees are rather tender when young, but they are hardy to about -30°C once they are established[200]. They grow best in southern Britain[11]. The honey locust is often cultivated in warm temperate zones for its edible seeds and seedpods[202], trees start to bear when about 10 years old and produce commercial crops for about 100 years[227]. Wild trees seldom live longer than 120 years[229]. Trees are shy to flower and therefore do not often produce a worthwhile crop in Britain due to our cooler summers[202]. There are some named varieties[183]. The sub-species nana produced lots of viable seed in the hot summer of 1989 at Kew[K], it also had a very good crop in 1994, 1996 and in 1999[K]. The sub-species inermis had a very good crop of pods in the autumn of 1996[K]. 'Ashwort' has pods with a very sweet pulp that has a melon-like flavour[183]. The flowers have a pleasing scent[245]. A very ornamental tree[1], the flowers are very attractive to bees[149, 269]. Trees have a light canopy, they come into leaf late and lose their leaves early[11] making them an excellent canopy tree for a woodland garden. Plants in this genus are notably resistant to honey fungus[200]. Unlike most plants in this family, honey locusts do not fix atmospheric nitrogen[160, 226]. Special Features:North American native, Naturalizing, Fragrant flowers, Inconspicuous flowers or blooms. The plant is heat tolerant in zones 7 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2]. The root pattern is a heart root, dividing from the crown into several primary roots going down and out [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

5.2.127 Carya x laneyi

4 tlin 8 cyuc 3 kcak 0 tcan 0 dwat 20 m hkuc
htut cyutli tcup hwicli hrasjlutnyk hpa7tli flatprikliw hpa7tmwatli fyif hjonli

drutta *Carya x laneyi* is a deciduous Tree growing to 20 m (65ft 7in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf from June to October, in flower from April to May. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

ksakta Edible Parts: SeedEdible Uses: Seed - raw or cooked[183]. Thin shelled[200]. The seed ripens in late autumn and, when stored in its shell in a cool place, will keep for at least 6 months[K].

tcanta Fuel WoodWood - close grained, tough, strong, brittle. Used mainly for fuel, it burns well giving off a lot of heat.

nrakta Eastern N. America - New York State. ksacta A naturally occurring hybrid.

propta Seed - requires a period of cold stratification. It is best sown in a cold frame as soon as it is ripe[78]. Stored seed should be kept moist (but not wet) prior to sowing and should be sown in a cold frame as soon as possible[78]. Where possible, sow 1 or 2 seeds only in each deep pot and thin to the best seedling. If you need to transplant the seedlings, then do this as soon as they are large enough to handle, once more using deep pots to accommodate the tap root. Put the plants into their permanent positions as soon as possible, preferably in their first summer, and give them some protection from the cold for at least the first winter[78, K]. Seed can also be sown in situ so long as protection is given from mice etc and the seed is given some protection from cold[200] (a plastic bottle with the top and bottom removed and a wire mesh top fitted to keep the mice out is ideal)

nwatta Prefers a deep moisture-retentive loam in a sunny sheltered position, requiring a good summer for best development[1, 63, 137, 200]. A natural hybrid, *C. cordiformis* x *C. ovata*, it is generally faster growing, bears at an earlier age and ripens its seed earlier than *C. ovata*, but lacks the high quality kernel[183]. There are some named varieties[183]. Plants are strongly tap-rooted and should be planted in their permanent positions as soon as possible[1, 137]. Sowing in situ would be the best method so long as the seed could be protected from mice[1, 200]. Trees are late coming into leaf (usually late May to June) and lose their leaves early in the autumn (usually in October)[137]. During this time they cast a heavy shade. These factors combine to make the trees eminently suitable for a mixed woodland planting with shrubs and other trees beneath them[137]. Plants in this genus are notably resistant to honey fungus[200]. Most species in this genus have quite a wide range of distribution and, in order to find trees more suited to this country, seed from the most appropriate provenances should be sought[137]. Most trees growing in Britain at present tend to only produce good seed after hot summers[137]. Trees are self-fertile but larger crops of better quality seeds are produced if cross-pollination takes place[229].

5.2.128 Juglans cathayensis

Chinese Walnut

4 tin 8 cyuc 3 kcaak 0 tcan 0 dwat 20 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyif hjonli

drutta *Juglans cathayensis* is a deciduous Tree growing to 20 m (65ft) by 20 m (65ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to June. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

ksakta Edible Parts: Oil SeedEdible Uses: OilSeed - raw or cooked[183]. Made into confections and sweet-meats[183]. A good flavour but the shell is very thick and the seed is small[11]. An edible oil is obtained from the seed[183], it tends to go rancid quickly.

tcanta Herbicide OilPlants produce chemicals which can inhibit the growth of other plants. These chemicals are dissolved out of the leaves when it rains and are washed down to the ground below, reducing the growth of plants under the tree[18, 20, 159]. The roots of many members of this genus produce substances that are toxic to many plant species, especially apples (*Malus* species), members of the Ericaceae, *Potentilla* spp and the white pines (certain *Pinus* spp.)[200].

nrakta E. Asia - China. ksacta Thickets and woods, preferring moist woods[109].

propta The seed is best sown as soon as it is ripe in individual deep pots in a cold frame[80]. You need to protect it from mice, birds, squirrels etc. The seed usually germinates in late winter or the spring. Plant out the seedlings into their permanent positions in early summer and give some protection from the cold for their first winter or two. The seed can also be stored in cool moist conditions (such s the salad compartment of a fridge) over the winter and sown in early spring but it may then require a period of cold stratification before it will germinate[78, 80].

nwatta Requires a deep well-drained loam and a sunny position sheltered from strong winds[1, 11]. Prefers a slightly alkaline soil[200]. Plants produce a deep taproot and they are intolerant of root disturbance[1, 11]. Seedlings should be planted out into their permanent positions as soon as possible and given some protection for their first winter or two since they are somewhat tender when young[1, 11]. Flower initiation depends upon suitable conditions in the previous summer[200]. The flowers and young growths can be destroyed by even short periods down to -2°c, but fortunately plants are usually late coming into leaf[200]. A plant growing in an open sunny position at Wisley Garden in Surrey has been seen on a number of occasions bearing good crops of seed[K]. This species is closely related to *J. mandshurica* and is included as a synonym of that species in some modern floras[266]. Any pruning should only be carried out in late summer to early autumn or when the plant is fully dormant otherwise wounds will bleed profusely and this will severely weaken the tree[200]. Trees have a dense canopy which tends to reduce plant growth below them. We have no specific information for this species, but the roots of several members of this genus produce substances that are toxic to many plant species, especially apples (*Malus* species), members of the Ericaceae, *Potentilla* spp and the white pines (certain *Pinus* spp.)[200]. The leaves of many species also secrete substances that have an inhibitory affect on plants growing underneath them. All in all this is not a very good companion plant[K].

5.2.129 Juglans x bisbyi

Buartnut

4 tin 8 cyuc 3 kcaak 2 tcan 0 dwat 20 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyif hjonli

drutta *Juglans x bisbyi* is a deciduous Tree growing to 20 m (65ft 7in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from May to June. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

ksakta Edible Parts: Oil SeedEdible Uses: OilSeed - raw[183]. The shell is thin and the seed well-flavoured[183, 200]. An edible oil is obtained from the seed, it tends to go rancid quickly.

tcanta Herbicide OilPlants produce chemicals which can inhibit the growth of other plants. These chemicals are dissolved out of the leaves when it rains and are washed down to the ground below, reducing the growth of plants under the tree[18, 20, 159]. The roots of many members of this genus produce substances that are toxic to many plant species, especially apples (*Malus* species), members of the Ericaceae, *Potentilla* spp and the white pines (certain *Pinus* spp.)[200]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

or early summer[K]. Layering in autumn. Easy, it takes about 6 months[78, 200]. Division of suckers in early spring. Very easy, they can be planted out straight into their permanent positions.

nwatta An easily grown plant, it succeeds in most soils, but is in general more productive of seeds when grown on soils of moderate fertility[11, 200]. It does less well in rich heavy soils or poor ones[11, 63]. Does well in a loamy soil[11]. Very suitable for an alkaline soil[11], but it dislikes very acid soils[17]. Plants are fairly wind tolerant[1, 11]. Members of this genus bear transplanting well and can be easily moved even when relatively large[11].

5.2.155 Malus coronaria

Garland Crab, Sweet crab apple

4 tin 8 cyuc 3 kcaak 0 tcan 1 dwat 7 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyikfripr hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Malus coronaria* is a deciduous Tree growing to 7 m (23ft) by 7 m (23ft). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from May to June, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

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

ksakta Edible Parts: FruitEdible Uses: PectinFruit - raw or cooked[159, 161]. Fairly large, it is up to 5cm in diameter[200]. Harsh and acid[11], it is mainly used for jellies[183] but can be eaten raw when it is fully ripe[101]. The fruits can be buried in the ground overwinter and will have lost much of their acidity by the spring[183]. The fruit can also be dried and stored for later use[257]. Rich in pectin, so it can be added to pectin-low fruits when making jams or jellies[226]. Pectin is also said to protect the body against radiation[201].

tcanta Pectin Rootstock WoodThe plant can be used as a rootstock for cultivated apples, conferring a greater hardiness[226]. Wood - heavy, close-grained, not strong[46, 82, 229]. It weighs 43lb per cubic foot[235]. Used for making levers, the handles of tools, small domestic items and fuel[46, 82, 229].

dwatta Abortifacient Astringent Birthing aid Emmenagogue Lithontripic OphthalmicAn infusion of the bark has been used to ease a difficult birth and also in the treatment of gallstones, piles and as a wash for sore mouths[257]. A cold infusion of the bark has been used as a wash for black eyes, sore eyes and snow blindness[257]. A decoction of the root has been used to treat suppressed menses and so can cause an abortion, especially early in the pregnancy[257].

nrakta Eastern N. America - New York to South Carolina, west to Kansas. ksacta Bottoms, wooded slopes, thickets and clearings[43] in most soil types and moisture levels[159].

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

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade, though it fruits less well in such a situation[200]. A slow-growing and short-lived tree in the wild[229]. The fruit is a good wildlife food source, especially for birds[200]. The flowers are sweetly scented[245]. This species is closely related to *M. ionensis*[1]. Plants in this genus are notably susceptible to honey fungus[200].

5.2.156 Corylus heterophylla

Siberian Filbert

4 tin 8 cyuc 3 keak 4 tcan 1 dwat 7 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikli-wisslip hpa7tmwatli fyif hjonli

drutta *Corylus heterophylla* is a deciduous Tree growing to 7 m (23ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to May, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

ksakta Edible Parts: Oil SeedEdible Uses: OilSeed - raw or cooked[46, 61, 105, 177]. The seed, which has a hard shell, is of relatively good flavour[183]. Rich in oil. The seed ripens in mid to late autumn and will probably need to be protected from squirrels[K]. When kept in a cool place, and not shelled, the seed should store for at least 12 months[K]. An edible oil is obtained from the seed.

dwatta Appetizer DigestiveThe seed is digestive and appetizer[218].

nrakta E. Asia - China, C. Japan. ksacta Wood margins and mountain slopes, forming dense thickets from E. Mongolia to N. China[74].

propta Seed - best sown as soon as it is harvested in autumn in a cold frame[164]. Germinates in late winter or spring. Stored seed should be pre-soaked in warm water for 48 hours and then given 2 weeks warm followed by 3 - 4 months cold stratification[164]. Germinates in 1 - 6 months at 20°c[164]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame or sheltered place outdoors for their first winter. Plant them out into their permanent positions in late spring or early summer[K]. Layering in autumn. Easy, it takes about 6 months[78, 200]. Division of suckers in early spring. Very easy, they can be planted out straight into their permanent positions.

nwatta Management: Coppice Management: Standard Other Systems: Strip intercrop Regional Crop Staple Crop: Protein-oilAn easily grown plant, it succeeds in most soils, but is in general more productive of seeds when grown on soils of moderate fertility[11, 200]. It does less well in rich heavy soils or poor ones[11, 63]. Does well in a loamy soil[11]. Very suitable for an alkaline soil[11], but it dislikes very acid soils[17]. Plants are fairly wind tolerant[1, 11]. This species is cultivated in Asia for its edible seed[61] but it is of little value as a nut bearer in Britain[1]. Closely related to *C. avellana*[1]. Members of this genus bear transplanting well and can be easily moved even when relatively large[11].

5.2.157 Crataegus pedicellata gloriosa

Scarlet Haw

4 tin 8 cyuc 3 kcaak 3 tcan 2 dwat 7 m hkuc hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfripr hpa7tli flatprikliwisslip hpa7tmwatli xre7t hjonli

drutta *Crataegus pedicellata gloriosa* is a deciduous Shrub growing to 7 m (23ft) by 7 m (23ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to May, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light

and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

ksakta Edible Parts: FruitEdible Uses: Edible fruit, raw or cooked[3, 105, 177]. Of good quality[183], the fruit is sweet and juicy, contains a few small seeds at the centre and has a hint of apple in the flavour[K]. The fruit is rich in iron and copper[226]. The fruit is up to 15mm in diameter[266].

nrakta E. Asia - China, Japan, Korea. ksakta Hilly and mountainous regions[58]. On slopes by streams, mixed forests at elevations of 1000 - 2000 metres[266].

propta Seed - it is best harvested 'green', when the seed is fully formed but before the seed coat has hardened, and then sown immediately in pots outdoors or in a cold frame. If stored seed is obtained early enough in the autumn, it can be given 4 weeks warm stratification before being left out in the winter and it should then germinate in the spring. Otherwise seed can be very slow to germinate, perhaps taking 18 months or more. When large enough to handle, prick the seedlings out into individual pots and grow them on in a sheltered outdoor position, planting them out once they are 20cm or more tall. If there is sufficient seed it is best to sow it thinly in an outdoor seedbed[78, 80]. Grow the seedlings on for two years in the seedbed before planting them out into their permanent positions during the winter. Layering in spring - takes 18 months[78]. Division of suckers in late winter. The suckers need to have been growing for 2 years before you dig them up, otherwise they will not have formed roots. They can be planted out straight into their permanent positions if required.

nwatta Prefers a rich loamy soil in a sunny position or semi-shade[1, 200] but thrives in any soil, including chalk, so long as it is not too dry or water-logged[11, 200]. Plants succeed in quite shady positions but do not flower or fruit well there[K]. Grows well in heavy clay soils. All members of this genus have edible fruits and, whilst this is dry and uninteresting in some species, in many others it is sweet and juicy. Many of the species have potential for use in the garden as edible ornamentals. The main draw-back to this genus is that birds adore the fruit and will often completely strip a tree before it is fully ripe[K]. A very ornamental plant[1], it is closely allied to A. canadensis and A. laevis, and is also very similar to A. arborea[11]. The sub-species A. asiatica sinica C. Schneid. is found in China. It has smaller fruits than the type species[200]. Hybridizes freely with other members of this genus[200]. Grafting onto seedlings of A. lamarckii or Sorbus aucuparia is sometimes practised in order to avoid the potential problem of hybridizing[1].

5.2.153 Malus sieversii

Crabapple

4 tlin 10 cyuc 3 kcaak 0 tcan 0 dwat 8 m hkuc hmimhtut cyutli tcup hwicli hrasljutnyikfrip hpa7tli flatprikli-wis hpa7tmwatli xre7t hjonli

drutta Malus sieversii is a deciduous Tree growing to 8 m (26ft 3in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

ksakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. Large and well-flavoured[74]. The fruit is usually between 3 - 5cm in diameter, though it can be up to 7cm[266].

nrakta C. Asia - western Tibet to Kazakhstan and Russia.. ksakta Mountain forests and slopes, streamsidles in mountain valleys[74]. Mountain summits, slopes and valleys, often the dominant tree of forests, at elevations of 1200 - 1300 metres in Tibet[266].

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

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[1, 200]. This species is vulnerable to extinction because of its limited range and exploitation[266]. It is believed to be the principal ancestor of commercially grown apples[266]. A parent of the cultivated apple[11], the large well-flavoured fruit is possibly of economic interest[74]. The fruit is a good wildlife food source, especially for birds[200]. Hybridizes freely with other members of this genus[200]. Plants in this genus are notably susceptible to honey fungus[200]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

5.2.154 Corylus cornuta californica

California Hazel

4 tlin 8 cyuc 3 kcaak 0 tcan 0 dwat 8 m hkuc hmimhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikli-wisslip hpa7tmwatli fyif hjonli

drutta Corylus cornuta californica is a deciduous Shrub growing to 8 m (26ft 3in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from April to May, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

ksakta Edible Parts: Oil SeedEdible Uses: OilSeed - raw or cooked[177]. Eaten fresh or preserved for winter use[183]. The seed ripens in mid to late autumn and will probably need to be protected from squirrels[K]. When kept in a cool place, and not shelled, the seed should store for at least 12 months[K]. An edible oil is obtained from the seed.

tcanta Biomass Fencing Fibre Oil PaperA fibre is obtained from the inner bark and is used to make paper[189]. The branches are removed in the autumn, the leaves removed and the branches steamed then the fibre is removed[189]. The fibres are cooked for two hours with lye and then put through a blender[189]. It makes a brown paper[189]. The fibre is also used for cordage[189].

nrakta South-western N. America. ksakta Damp slopes and banks below 2100 metres in California[71].

propta Seed - best sown as soon as it is harvested in autumn in a cold frame[164]. Germinates in late winter or spring. Stored seed should be pre-soaked in warm water for 48 hours and then given 2 weeks warm followed by 3 - 4 months cold stratification[164]. Germinates in 1 - 6 months at 20°C[164]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame or sheltered place outdoors for their first winter. Plant them out into their permanent positions in late spring

nrakta A hybrid of garden origin, J. cinerea x J. ailanthifolia cordiformis. ksakta Not known in the wild.

propta The seed is best sown as soon as it is ripe in individual deep pots in a cold frame[80]. You need to protect it from mice, birds, squirrels etc. The seed usually germinates in late winter or the spring. Plant out the seedlings into their permanent positions in early summer and give some protection from the cold for their first winter or two. The seed can also be stored in cool moist conditions (such as the salad compartment of a fridge) over the winter and sown in early spring but it may then require a period of cold stratification before it will germinate[78, 80, 113]. This is a hybrid species and so it might not breed true from seed.

nwatta Requires a deep well-drained loam and a sunny position sheltered from strong winds[1, 11]. Prefers a slightly alkaline soil[200]. Plants produce a deep taproot and they are intolerant of root disturbance[1, 11]. Seedlings should be planted out into their permanent positions as soon as possible and given some protection for their first winter or two since they are somewhat tender when young[1, 11]. Flower initiation depends upon suitable conditions in the previous summer[200]. The flowers and young growths can be destroyed by even short periods down to -2°C, but fortunately plants are usually late coming into leaf[200]. Any pruning should only be carried out in late summer to early autumn or when the plant is fully dormant otherwise wounds will bleed profusely and this will severely weaken the tree[200]. Trees have a dense canopy which tends to reduce plant growth below them. We have no specific information for this species, but the roots of several members of this genus produce substances that are toxic to many plant species, especially apples (Malus species), members of the Ericaceae, Potentilla spp and the white pines (certain Pinus spp.)[200]. The leaves of many species also contain substances that have an inhibitory effect on plants growing underneath them. All in all this is not a very good companion plant[K]. A hybrid, J. cinerea x J. ailanthifolia cordiformis, it is sometimes cultivated for its edible seed, there are some named varieties[183]. This hybrid combines the best qualities of each parent[200] - the aromatic kernel flavour and superior climatic adaptability of J. cinerea with the higher yields, better appearance and crackability of J. ailanthifolia cordiformis[183]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2].

5.2.130 Quercus stellata

Post Oak

4 tlin 8 cyuc 3 kcaak 0 tcan 2 dwat 20 m hkuc hmimhtut cyutli hgattcup hwicli jlutnyik hpa7tli flatprikli-wis hpa7tmwatli hjonli

drutta Quercus stellata is a deciduous Tree growing to 20 m (65ft 7in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to May, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure.

ksakta Edible Parts: SeedEdible Uses: CoffeeSeed - raw or cooked[61, 63, 105]. A sweet taste[159]. The seed is up to 25mm long and 18mm wide[82, 200], it can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed from some trees might contain bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the

spring when it would have lost most of its astringency. The roasted seed is a coffee substitute[177, 257].

tcanta Disinfectant Repellent Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. Wood - very heavy, hard, close grained, very durable in contact with the soil but difficult to cure. It weighs about 52lb per cubic foot. It is largely used for fencing, lumber, furniture and fuel[46, 61, 82, 149, 159, 171, 227].

dwatta Antiaphonic Astringent Disinfectant Dysentery Emetic Febrifuge TonicThe bark is astringent, disinfectant, emetic, febrifuge and tonic[257]. An infusion is used in the treatment of chronic dysentery, indigestion, asthma, lost voice and intermittent fevers[257]. The bark can be chewed to treat mouth sores[257]. An infusion of the bark can be used as a wash on sore and chapped skin[257]. Any galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta South-eastern N. America - Massachusetts to New York, Iowa, Florida and Texas. ksakta Rocky or sandy ridges and outcrops, also in dry woodlands in a variety of soils including gravely, sandy, poor upland soils and heavy moist loamy soils, where it reaches its greatest height[229].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. Prefers warmer summers than are usually experienced in Britain, trees often grow poorly in this country and fail to properly ripen their wood resulting in frost damage overwinter[200]. A slow-growing drought resistant tree, it takes 20 - 30 years before it produces seed[229]. It then usually produces a good crop of seeds every 2 - 4 years[229]. The tree flowers on new growth produced in spring, the seed ripening in its first year[200, 229]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200].

5.2.131 Juglans ailanthifolia

Japanese Walnut

4 tlin 8 cyuc 3 kcaak 5 tcan 1 dwat 20 m hkuc htut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikli-wis hpa7tmwatli fyif hjonli

drutta Juglans ailanthifolia is a deciduous Tree growing to 20 m (65ft) by 15 m (49ft). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in June. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

ksakta Edible Parts: Leaves Oil SeedEdible Uses: OilSeed - raw, cooked or used in confectionery[22, 105, 177, 183]. A very good flavour[2]. The shell is easily cracked[117]. An edible oil is obtained from the seed, but it tends to go rancid quickly[183]. Young buds (flower?) and fruit stalks - cooked[105, 177, 183].

tcanta Companion Dye Herbicide Oil Tannin WoodA brown dye is obtained from the seed husks and the bark[61]. Rich in tannin, it does not require a mordant. The bark is

rich in tannin. It is used as a dye and also medicinally[178]. Plants produce chemicals which can inhibit the growth of other plants. These chemicals are dissolved out of the leaves when it rains and are washed down to the ground below, reducing the growth of plants under the tree[18, 20, 159]. The roots of many members of this genus produce substances that are toxic to many plant species, especially apples (Malus species), members of the Ericaceae, Potentilla spp and the white pines (certain Pinus spp.)(200). Wood - soft, light, not easily cracked, of good quality. Used for cabinet making etc[46, 61]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Anthelmintic Astringent Diuretic Kidney Lithontripic Pectoral Skin TonicThe bark is anthelmintic, astringent, diuretic, lithontripic, pectoral, skin, tonic (kidneys)[178].

nrakta E. Asia - Japan. ksacta Forests[11].

propta The seed is best sown as soon as it is ripe in individual deep pots in a cold frame[80]. You need to protect it from mice, birds, squirrels etc. The seed usually germinates in late winter or the spring. Plant out the seedlings into their permanent positions in early summer and give some protection from the cold for their first winter or two. The seed can also be stored in cool moist conditions (such s the salad compartment of a fridge) over the winter and sown in early spring but it may then require a period of cold stratification before it will germinate[78, 80].

nwatta Requires a deep well-drained loam and a sunny position sheltered from strong winds[1, 11]. Prefers a slightly alkaline soil[200]. This is the hardiest member of the genus, capable of growing in all areas of Britain[63]. It is also resistant to the attacks of most insects[160]. The young growth in spring, however, can be damaged by late frosts. This species is cultivated for its edible seed in Japan, it has the potential for producing very superior nuts, especially if hybridized with J. cinerea[117, 160]. Trees can come into bearing within 3 - 4 years from seed[63]. Plants produce a deep taproot and they are intolerant of root disturbance[1, 11]. Seedlings should be planted out into their permanent positions as soon as possible and given some protection since they are somewhat tender when young[1, 11]. Flower initiation depends upon suitable conditions in the previous summer[200]. The flowers and young growths can be destroyed by even short periods down to -2°C, but fortunately plants are usually late coming into leaf[200]. Any pruning should only be carried out in late summer to early autumn or when the plant is fully dormant otherwise wounds will bleed profusely and this will severely weaken the tree[200]. Trees have a dense canopy which tends to reduce plant growth below them. We have no specific information for this species, but the roots of several members of this genus produce substances that are toxic to many plant species, especially apples (Malus species), members of the Ericaceae, Potentilla spp and the white pines (certain Pinus spp.)(200). The leaves of many species also secrete substances that have an inhibitory affect on plants growing underneath them. All in all this is not a very good companion plant[K]. The plant is heat tolerant in zones 8 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

5.2.132 Juniperus occidentalis

Western Juniper

4 tlin 8 cyuc 3 kcaak 3 tcan 2 dwat 18 m hkuc
htut cyuti hgatyuctup hwicli hrasjltunykrip hpa7tli flatprikli-wissliip hpa7tmwatli dyat hjonli

drutta Juniperus occidentalis is an evergreen Tree growing to 18 m (59ft 1in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. kcaakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[46, 61, 105]. A thin dry flesh[82] with a resinous flavour[2, 82]. The fruit is sweet and nutritious[2], it can also be dried or ground into a powder and mixed with cereal flours to be made into a bread[161]. The cones are about 10mm in diameter, they take 2 years to mature[200].

tcanta Basketry Beads Fibre Fuel Incense Lighting Miscellany Tinder WoodThe bark is employed as a tinder and is also made into a slow match[216, 257]. The crushed bark was twisted into a rope, tied at intervals with yucca (Yucca species), and wrapped into a coil. The free end was set on fire and kept smouldering by blowing on it at intervals. Fire could be carried in this fashion for several hours[257]. The bark can be wound around a stick and used as a torch to provide light and carry fire to a new campsite[257]. The bark can be rubbed between the hands until it is soft and the fibres can then be woven into clothing[257]. The bark can also be rolled into rope, coiled and then sown to form sandal shoes[257]. The root fibre is used to make twined baskets[257]. The branches have been burnt as an incense and fumigant in the home[257]. The dried seeds have been used as beads or as the 'rattle' in rattles[216]. Wood - very close-grained, light, soft, exceedingly durable. It is easily worked and can be exquisitely finished. Because of its small size, however, it is mainly used for fencing, fuel[46, 61, 82, 229].

dwatta Analgesic Antiseptic Birthing aid Blood tonic Diuretic Febrifuge Laxative Miscellany Odontalgic PoulticeWestern juniper was quite widely employed as a medicinal herb by a number of native North American tribes who used it to treat a variety of complaints, especially those related to the kidneys and the skin[257]. It is rarely, if at all, used in modern herbalism. The leaves are blood tonic and laxative[216]. A decoction is used in the treatment of constipation, coughs and colds[216]. An infusion of the leaves has been taken by pregnant women prior to giving birth in order to relax the muscles[257]. A poultice of the pounded moistened leaves has been applied to the jaw to treat swollen and sore gums and toothaches[257]. The berries are analgesic, blood tonic and diuretic[257]. A decoction is used to relieve the pain of menstrual cramps and to induce urination[257]. Externally, the decoction is used as a poultice on rheumatic joints[257]. The young twigs are antiseptic, blood tonic and febrifuge[257]. A decoction is used in the treatment of kidney problems, fevers, stomach aches, smallpox, influenza and haemorrhages[257]. The branches have been used in a sweat bath to ease rheumatism[257]. A poultice of the twigs has been used as a dressing on burns and as a drawing agent on boils or splinters[257]. A decoction has been used as an antiseptic wash on sores[257]. The leaves or young twigs have been burnt and the smoke inhaled to ease the pain of headaches[257].

nrakta Western N. America - British Columbia to the Sierra Nevada. ksacta Usually found on thin rocky or sandy soils[229] on desert foothills and lower mountains[60], also on windswept peaks[82] up to elevations of 3,000 metres where they become low gnarled shrubs[229].

propta The seed requires a period of cold stratification. The seed has a hard seedcoat and can be very slow to germinate, requiring a cold period followed by a warm period and then another cold spell, each of 2 - 3 months duration[78, 81]. Soaking the seed for 3 - 6 seconds in boiling water may speed up the germination process[11]. The seed is best sown as soon as it is ripe in a cold frame. Some might germinate in the following spring, though most will take another year.

soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade, though it fruits less well in such a situation[200]. A very ornamental tree[1], it is much cultivated in China for its edible fruit[11]. The fruit is a good wildlife food source, especially for birds[200]. Hybridizes freely with other members of this genus[200]. Plants in this genus are notably susceptible to honey fungus[200].

5.2.150 Crataegus opaca

Western Mayhaw

4 tlin 8 cyuc 3 kcaak 3 tcan 2 dwat 9 m hkuc
hmimhtut cyuti hgattcuphja7n hwicli hrasjltunykrip hpa7tli frusflatprikliwis hpa7tmwatli xre7t hjonli

drutta Crataegus opaca is a deciduous Shrub growing to 9 m (29ft 6in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in March, and the seeds ripen from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcaakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[160]. Juicy and acid with a pleasant flavour[2]. It is up to 2cm in diameter[227]. The fruit is frequently used and much prized in parts of southern N. America where it is often gathered in quantity from the wild. Its acid flavour makes it a favourite for preserves and jellies[82, 183, 227]. The fruit can also be dried for later use. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard and strong, but not large enough for commercial use[227]. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotoxic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta Southern N. America - North Carolina to Mississippi. ksacta Deep depressions filled with water for most of the year, borders of swamps, low river banks etc[82].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them out in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. It thrives

in acid soils[160]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. A very hardy species, tolerating temperatures down to about -30°C[160]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. Occasionally cultivated for its fruit in America, there are some named varieties[183].

5.2.151 Pyrus pashia

Indian Wild Pear

4 tlin 8 cyuc 3 kcaak 0 tcan 1 dwat 9 m hkuc
hmimhtut cyuti hgattcup hwicli hrasjltunykrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Pyrus pashia is a deciduous Tree growing to 9 m (29ft 6in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in April. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. It can tolerate atmospheric pollution.

kcaakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 11, 51, 105, 158, 272]. Up to 2.5cm in diameter[194]. The fruit is usually bletted[183], but even then it is not sweet[146]. Tasty when fully ripe, even when dried[194]. Our experience is that the fully ripe fruit has a reasonable flavour and, when bletted, is sweet and very pleasant[K]. A mature tree yields about 45kg of fruit per year[194]. The fruit contains about 6.8% sugars, 3.7% protein, 1% ash, 0.4% pectin. Vitamin C is very low, about 1.2mg per 100g[194].

tcanta Rootstock WoodThis plant can be used as a rootstock for the cultivated pear[194]. Wood - compact fine grained, hard, durable, liable to split and warp during seasoning. Used for small implements, walking sticks and fuel[51, 158, 266].

dwatta AstringentThe juice of the ripe fruit is used in the treatment of diarrhoea[272].

nrakta E. Asia - Afghanistan to W. China. ksacta Shrub-beries in the Himalayas to 2700 metres[51].

propta Seed - best sown in a cold frame as soon as it is ripe in the autumn, it will then usually germinate in mid to late winter. Stored seed requires 8 - 10 weeks cold stratification at 1°C and should be sown as early in the year as possible[200]. Temperatures over 15 - 20°C induce a secondary dormancy in the seed[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for their first year. Plant them out in late spring or early summer of the following year.

nwatta Prefers a good well-drained loam in full sun[200]. Grows well in heavy clay soils. Tolerates light shade but does not fruit so well in such a position. Tolerates atmospheric pollution, excessive moisture and a range of soil types if they are moderately fertile[200]. Established plants are drought tolerant[200]. Plants are hardy to at least -15°C[200].

5.2.152 Amelanchier asiatica

Korean Juneberry

4 tlin 8 cyuc 3 kcaak 0 tcan 0 dwat 8 m hkuc
hmimhtut cyuti kcup hwicli hrasjltunykrip hpa7tli flatprikliwis hpa7tmwatli fyfjxre7t hjonli

drutta Amelanchier asiatica is a deciduous Tree growing to 8 m (26ft) by 10 m (32ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs)

pcista Although the fruit of this plant is quite often used medicinally and as a flavouring in various foods and drinks, large doses of the fruit can cause renal damage. Juniper should not be used internally in any quantities by pregnant women[65, 165]. Diarrhoea with repeated use. Avoid in kidney disease. Do not use internally for more than 6 weeks [301].

kwakta Edible Parts: Fruit Leaves SeedEdible Uses: Coffee Condiment TeaFruit - raw or cooked[2, 5, 9, 15]. It is usually harvested in the autumn when fully ripe and then dried for later use[12]. A soft, mealy, sweet, resinous flesh[82]. The fruit is often used as a flavouring in sauerkraut, stuffings, vegetable pates etc, and is an essential ingredient of gin[183]. The aromatic fruit is used as a pepper substitute according to one report[183]. An essential oil is sometimes distilled from the fruit to be used as a flavouring[183]. Average yields are around 1%[7]. The cones are about 4 - 8mm in diameter and take 2 - 3 years to mature[82, 200]. Some caution is advised when using the fruit, see the notes above on toxicity. The roasted seed is a coffee substitute[177]. A tea is made by boiling the leaves and stems[161]. A tea made from the berries has a spicy gin-like flavour[183].

tcanta Fibre Fuel Hair Incense Repellent Resin Strewing TinderA decoction of the branches is used as an anti-dandruff shampoo[172]. The essential oil distilled from the fruits is used in perfumes with spicy fragrances[238]. In hot countries the tree yields the resin 'Sandarac' from incisions in the trunk[4, 74]. This is used in the production of a white varnish[74]. The stems were at one time used as a strewing herb to sweeten the smell of rooms[14, 244]. The whole plant can be burnt as an incense and fumigant[66, 102, 146]. It was used during epidemics in the belief that it would purify the air and cleanse it of infection[244]. Fresh or dried juniper branches also make a good insect repellent[102, 172]. Many forms of this species are good ground cover plants for sunny situations[208]. Forms to try include 'Depressa Aurea', 'Dumosa', 'Effusa', and 'Repanda'[197]. 'Prostrata' can also be used[188]. The bark is used as cordage[61] and as a tinder[172]. Wood - strong, hard, fragrant, very durable in contact with the soil and very close-grained, but usually too small to be of much use[82, 229, 244, 245]. It makes an excellent fuel[66].

dwatta Antiseptic Aromatherapy Aromatic Carminative Diaphoretic Diuretic Rubefacient Stomachic Tonic UrinaryJuniper fruits are commonly used in herbal medicine, as a household remedy, and also in some commercial preparations. They are especially useful in the treatment of digestive disorders plus kidney and bladder problems[4]. The fully ripe fruits are strongly antiseptic, aromatic, carminative, diaphoretic, strongly diuretic, rubefacient, stomachic and tonic[4, 7, 9, 21, 46, 165, 240, 254]. They are used in the treatment of cystitis, digestive problems, chronic arthritis, gout and rheumatic conditions[254]. They can be eaten raw or used in a tea[222], but some caution is advised since large doses can irritate the urinary passage[4]. Externally, it is applied as a diluted essential oil, having a slightly warming effect upon the skin and is thought to promote the removal of waste products from underlying tissues[254]. It is, therefore, helpful when applied to arthritic joints etc[254]. The fruits should not be used internally by pregnant women since this can cause an abortion[9]. The fruits also increase menstrual bleeding so should not be used by women with heavy periods[254]. When made into an ointment, they are applied to exposed wounds and prevent irritation by flies[4]. The essential oil is used in aromatherapy. Its keyword is 'Toxin elimination'[210].

nrakta Northern temperate zone, incl Britain, south to the mountains of N. Africa, Himalayas and California ksacta Chalk downs in S. England but only where there is least sunshine and most rain, heaths, moors, pine and birch woods in the north of Scotland on acid peat, often dominant on chalk, limestone and slate.

propta The seed requires a period of cold stratification. The seed has a hard seedcoat and can be very slow to germinate, requiring a cold period followed by a warm period and then another cold spell, each of 2 - 3 months duration[78, 81]. Soaking the seed for 3 - 6 seconds in boiling water may speed up the germination process[11]. The seed is best sown as soon as it is ripe in a cold frame. Some might germinate in the following spring, though most will take another year. Another possibility is to harvest the seed 'green' (when the embryo has fully formed but before the seedcoat has hard-

ened). The seedlings can be potted up into individual pots when they are large enough to handle. Grow on in pots until large enough, then plant out in early summer. When stored dry, the seed can remain viable for several years[1]. Cuttings of mature wood, 5 - 10cm with a heel, September/October in a cold frame. Plant out in the following autumn[1, 78]. Layering in September/October. Takes 12 months[78].

nwatta Landscape Uses:Specimen. An easily grown plant, it succeeds in hot dry soils and in poor soils. Succeeds in most soils so long as they are well drained[186], preferring a neutral or slightly alkaline soil. Does well in chalky soils[1]. Grows well in heavy clay soils. Tolerates a pH range from 4 to 8[186]. Succeeds in light woodland but dislikes heavy shade[186]. Established plants are very tolerant of drought[186]. Although the fully dormant plant is cold-tolerant throughout Britain, the young growth in spring can be damaged by late frosts. All parts of the plant are very aromatic[245]. Juniper is a very polymorphic species that has a long history of culinary and medicinal use[244]. It is frequently grown in the ornamental and herb garden, there is a huge range of cultivars of widely diverse habits[11, 81]. At least some forms tolerate maritime exposure[186], there is a thriving colony in an exposed position at Land's End in Cornwall[81]. The fruits take 2 - 3 years to ripen on the plant[11]. Plants are usually very slow growing, often only a few centimetres a year[186]. Resists honey fungus[88]. Plants are sometimes attacked by a rust, this fungus has an aecidial stage on hawthorn (*Crataegus* spp.)[1]. Dioecious. Male and female plants must be grown if seed is required. Special Features: North American native, Fragrant foliage, Inconspicuous flowers or blooms.

5.2.149 Malus spectabilis

Chinese Flowering Apple, Asiatic apple
4 tlin 8 cyuc 3 kcaak 0 tcan 0 dwat 9 m hkuc
hmimhtut cyutli tcup hwicli hrasjltunykfrp hpa7tli flatprikli-wis hpa7tmwatli xre7t hjonli

drutta *Malus spectabilis* is a deciduous Tree growing to 9 m (29ft) by 9 m (29ft). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from April to May, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

kwakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 105]. About 2 - 3 cm in diameter[200]. Bitter and harsh when eaten fresh[11], when stored in a cool dry place and allowed to blett it becomes quite acceptable[K].

nrakta E. Asia - China. ksacta Plains and mountain regions at elevations of 500 - 2000 metres[266].

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

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy

Another possibility is to harvest the seed 'green' (when the embryo has fully formed but before the seedcoat has hardened). The seedlings can be potted up into individual pots when they are large enough to handle. Grow on in pots until large enough, then plant out in early summer. When stored dry, the seed can remain viable for several years[1]. Cuttings of mature wood, 5 - 10cm with a heel, September/October in a cold frame. Plant out in the following autumn[1, 78]. Layering in September/October. Takes 12 months[78].

nwatta Succeeds in most soils, including chalk, so long as they are well drained[1, 11], preferring a neutral or slightly alkaline soil[11]. Established plants are drought tolerant, succeeding in hot dry positions[200]. Plants are slow-growing, though they can live for 3000 years in the wild[200, 229]. They are much shorter-lived in cultivation[200], growing better in dry areas with hot summers[200]. Western Britain is generally too cool and wet for this species to thrive[200]. Plants are usually monoecious but are sometimes dioecious. Male and female plants must usually be grown if seed and fruit is required. The fruit takes two summers to ripen[229]. Plants are resistant to honey fungus[88]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is flat with shallow roots spreading near the soil surface [2-1].

5.2.133 Vitis labruscana

4 tlin 8 cyuc 3 kcaak 0 tcan 0 dwat 15 m hkuc
hmimhtut cyutli kyuctup hwicli hrasjltunyk hpa7tli flatprikli-wis hpa7tmwatli xre7t hjonli

drutta *Vitis labruscana* is a deciduous Climber growing to 15 m (49ft 3in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to July, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kwakta Edible Parts: Fruit LeavesEdible Uses: Fruit - raw or dried for winter use[11, 177]. A 'foxy' flavour that is not normally relished in Europe[11]. However, the fruit is larger and less 'foxy' than *V. labrusca*[11]. The fruit is about 25mm in diameter[200] and is carried in fairly large bunches. The fruit is commonly used for making wine in N. America[11]. Young leaves are wrapped around other foods and then baked, they impart a pleasant flavour. Young tendrils - raw or cooked.

tcanta DyeA yellow dye is obtained from the fresh or dried leaves[168]. Greenish-blue and dark blue dyes can be obtained from the fruit skins of the cultivar 'Concord'[168].

nrakta A hybrid of garden origin, *V. labrusca* x *V. vinifera*[11]. ksacta Not known in the wild.

propta Seed - best sown in a cold frame as soon as it is ripe[K]. Six weeks cold stratification improves the germination rate, and so stored seed is best sown in a cold frame as soon as it is obtained. Germination should take place in the first spring, but sometimes takes another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant out in early summer. This is a hybrid species and so seed is unlikely to breed true. Cuttings of mature wood of the current seasons growth, December/January in a frame. These cuttings can be of wood 15 - 30cm long or they can be of short sections of the stem about 5cm long with just one bud at the top of the section. In this case a thin, narrow strip of the bark about 3cm long is removed from the bottom half of the side of the stem. This will encourage callusing and the formation of roots. Due to the size of these cuttings they need to be kept in a more protected environment than the longer cuttings. Layering.

nwatta Prefers a deep rich moist well-drained moderately fertile loam[1, 200]. Grows best in a calcareous soil[200]. Succeeds in sun or partial shade though a warm sunny position is required for the fruit to ripen[200]. The young growth in spring can be damaged by late frosts. Cultivated for its edible fruits, used mainly for making wine, in Eastern N. America[11]. There are many named varieties.

Plants climb by means of tendrils[182]. Any pruning should be carried out in winter when the plants are dormant otherwise they bleed profusely[182, 200]. Plants in this genus are notably susceptible to honey fungus[200].

5.2.134 Vitis labrusca

Northern Fox Grape, Fox grape
4 tlin 9 cyuc 3 kcaak 2 tcan 1 dwat 15 m hkuc
hmimhtut cyutli kyuctup hwicli hrasjltunyk hpa7tli flatprikli-wis hpa7tmwatli xre7t hjonli

drutta *Vitis labrusca* is a deciduous Climber growing to 15 m (49ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from May to July, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kwakta Edible Parts: Fruit Leaves Oil Sap ShootsEdible Uses: OilFruit - raw or dried for winter use[1, 2, 46, 61, 161]. The fruit can also be made into pies, preserves etc[183]. A distinctive musky aroma and taste that is not acceptable to many people[11, 183, 200]. The fruit is best after a frost[101]. Sweetish[43], it contains 6.6 - 16.6% sugars[179]. The fruit is up to 2cm in diameter[200] and is produced in fairly large bunches[235]. Young leaves - cooked[55, 159]. A pleasant acid flavour, they are cooked as greens or can be wrapped around other foods and then baked, when they impart a pleasant flavour[183]. Young tendrils - raw or cooked[55, 85, 159]. Sap. Best harvested in the spring or early summer, it has a sweet flavour and makes a pleasant drink[101]. The sap should not be harvested in quantity or it will weaken the plant[K]. An oil is obtained from the seed[46, 61]. This would only really be a viable crop if large quantities of grapes were being grown for wine.

tcanta Dye Miscellany Oil RootstockA yellow dye is obtained from the fresh or dried leaves[168]. The plant is used as a rootstock for the common grape, *V. vinifera*, especially in areas where phylloxera disease is prevalent[61].

dwatta Miscellany Poultice UrinaryThe leaves are hepatic[257]. An infusion has been used in the treatment of diarrhoea, hepatitis, stomach aches, fevers, headaches and thrush[222, 257]. Externally, the leaves are poulticed and applied to sore breasts, rheumatic joints and headaches[222, 257]. The wilted leaves have been applied as a poultice to the breasts to draw away soreness after the birth of a child[257]. An infusion of the bark has been used to treat urinary complaints[257].

nrakta Eastern N. America - Maine to S. Carolina and Tennessee. Locally naturalized in Europe[50]. ksacta Wet or dry thickets and woodland borders[43].

propta Seed - best sown in a cold frame as soon as it is ripe[K]. Six weeks cold stratification improves the germination rate, and so stored seed is best sown in a cold frame as soon as it is obtained. Germination should take place in the first spring, but sometimes takes another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant out in early summer. Cuttings of mature wood of the current seasons growth, December/January in a frame. These cuttings can be of wood 15 - 30cm long or they can be of short sections of the stem about 5cm long with just one bud at the top of the section. In this case a thin, narrow strip of the bark about 3cm long is removed from the bottom half of the side of the stem. This will encourage callusing and the formation of roots. Due to the size of these cuttings they need to be kept in a more protected environment than the longer cuttings. Layering.

nwatta Prefers a deep rich moist well-drained moderately fertile loam[1, 200]. Grows best in a calcareous soil[200]. Succeeds in sun or partial shade though a warm sunny position is required for the fruit to ripen[200]. The young growth in spring can be damaged by late frosts. Plants climb by means of tendrils[182], they grow particularly well into elm trees[18]. The flowers have the sweet scent of magnonette[245]. Any pruning should be carried out in winter when the plants are dormant otherwise they bleed profusely[182, 200]. Cultivated for its edible fruit in N. Amer-

ica, where it can produce yields of up to 17 tonnes per hectare[183]. It is the parent of several named varieties[1, 43, 183]. However, it is of no value as a fruit bearer in Britain, requiring hotter summers than are usually experienced in this country in order to ripen its fruit[11]. Another report says that this species is of interest for its hardiness and its ability to produce crops in cooler climates[200]. Resistant to Phylloxera disease, a disease that almost destroyed the European grape crops. This species can be used as a root-stock in areas where the disease is prevalent[61] and can also be used in breeding programmes with *V. vinifera* in order to impart resistance to that species[183]. Plants in this genus are notably susceptible to honey fungus[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. Woody. Growth habit is a single or multiple shooting vine from a crown [1-2].

5.2.135 Morus rubra

Red Mulberry, Common Mulberry, White Mulberry
4 tin 9 cyuc 3 ckak 2 tcan 2 dwat 15 m hkuc
hminhtut cyutli tucp hwicli hrasjlutnyik hpa7tli flatprikliwv hpa7tmwatli nyanhjen hjonli

drutta Morus rubra is a deciduous Tree growing to 15 m (49ft 3in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in May, and the seeds ripen from July to August. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). . The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pista Skin contact with the leaves or stems can cause dermatitis in some very sensitive people[226]. The milky sap in the leaves and unripe fruits can cause dermatitis, hallucinations and central nervous system disturbances[274].

kcakta Edible Parts: Fruit Leaves ShootsEdible Uses: Fruit - raw, cooked or made into preserves[2, 3, 21, 62, 149, 183]. Large and sweet with a good flavour, the fruit can be up to 3cm long[200]. The fruit can also be dried and ground into a powder[183]. This is used to make a delicious confection with almonds and other nuts[183]. The fruit is soft and juicy, when fully ripe it falls from the tree and is easily squashed[227]. Unripe fruits can cause stomach disorders[226]. Young shoots and unfolding leaves - raw or cooked. The related White Mulberry (*Morus alba*) has edible young leaves and shoots eaten cooked[105, 183] but we have found no information for this plant.

tcanta Fibre WoodA cloth can be made from the fibrous bark[149]. Wood - coarse-grained, light, very durable, not strong, soft, rather tough. It weighs about 45lb per cubic foot and is used for boats, fencing and cooperage[46, 61, 82, 227, 229].

dwatta Anthelmintic Cathartic Dysentery FebrifugeThe root bark is anthelmintic and cathartic[21]. A tea made from the roots has been used in the treatment of weakness, difficult urination, dysentery, tapeworms and as a panacea[222, 257]. The sap is used in the treatment of ringworm[222, 257]. Another report says that the milky juice obtained from the axis of the leaf is used[21]. The fruits are used to reduce fevers[222].

nrakta Eastern N. America - Quebec to Florida, west to Texas and South Dakota. ksacta Rich moist woods[43, 227]. Sunny places along the sides of roads[159]. Plants do not grow well on poor soils[227].

propta The seed germinates best if given 2 - 3 months cold stratification[80, 98]. Sow the seed as soon as it is ripe if possible, otherwise in February in a cold frame. The seed usually germinates in the first spring, though it sometimes takes another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the cold frame for their first winter. Plant them out in late spring or early summer after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame. Plant out in spring. A good percentage take, though they sometimes fail to thrive[78, 113]. Cuttings of mature wood of the current season's growth, 25 - 30cm with

a heel of 2 year old wood, autumn or early spring in a cold frame or a shady bed outside[78, 113, 200]. Bury the cuttings to threequarters of their depth. Layering in autumn[200].

nwatta Landscape Uses:Pest tolerant, Aggressive surface roots possible, Pollard. Prefers a warm well-drained loamy soil in a sunny position[1, 11]. The red mulberry is sometimes cultivated for its edible fruit, there are some named varieties[183]. It is said to be of no value as a fruiting tree in Britain[1, 11]. Trees come into bearing when about 10 years old, fruiting best between the ages of 30 - 85 years and declining from the age of 125 years[227]. A good plant to grow grapes into. The grapes are difficult to pick but they always seem to be healthier and free from fungal diseases[201]. Mulberries have brittle roots and so need to be handled with care when planting them out[238]. Any pruning should only be carried out in the winter when the plant is fully dormant because mulberries bleed badly when cut[238]. Ideally prune only badly placed branches and dead wood[238]. Plants in this genus are notably resistant to honey fungus[200]. Dioecious[229] Male and female plants must be grown if fruit is required. Special Features: Not North American native, Naturalizing, There are no flowers or blooms. The plant is heat tolerant in zones 9 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. The root pattern is a heart root, dividing from the crown into several primary roots going down and out [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

5.2.136 Sorbopyrus auricularis

Bollwyller Pear

4 tin 8 cyuc 3 ckak 0 tcan 0 dwat 12 m hkuc
hminhtut cyutli tucp hwicli hrasjlutnyik hpa7tli flatprikliwv hpa7tmwatli xre7t hjonli

drutta Sorbopyrus auricularis is a deciduous Tree growing to 12 m (39ft 4in). See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf from May to November, in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[183]. The fruit has a dry and sweet yellowish flesh[11, 200]. Rather like a small pear, it has a very nice flavour when fully ripe[K]. The fruit is up to 5cm long[200].

nrakta A bi-generic hybrid of garden origin. ksacta Not known in the wild.

propta Seed - best sown in a cold frame as soon as it is ripe if this is possible, otherwise in late winter. The plant produces very little fertile seed, and this does not breed true[200], though some interesting plants might be produced[K]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Grafting is the best method of propagating this plant. This is best carried out in early spring, though budding can be carried out in the summer.

nwatta Succeeds in a well-drained moisture-retentive soil in an open sunny position[200]. Succeeds in light shade but fruits less well in such a position. This species is a bi-generic hybrid of garden origin between *Sorbus aria* and *Pyrus communis*[183].

use these seeds as an oil source if the fruit was being used for some purpose such as making cider and then the seeds could be extracted from the remaining pulp[K]. A very pleasant tea can be made from the leaves[7].

tcanta Dye Fuel Oil Pectin PectinThe fruit is a source of pectin[61, 142]. Pectin is used as a thickener in jams etc and as a culture medium in laboratories. Ared to yellow dye is obtained from the bark[257]. The wood is an excellent fuel[67].

dwatta Anthelmintic Antibacterial Astringent Hypnotic Laxative RefrigerantThe fruit is astringent and laxative[4, 9]. The crushed fruit pulp can be used as a poultice to heal inflammations or small flesh wounds[7]. The fruit is eaten to obviate constipation[240]. The bark, and especially the root bark, is anthelmintic, refrigerant and soporific[218, 240]. An infusion is used in the treatment of intermittent, remittent and bilious fevers[4, 240]. The leaves contain up to 2.4% of an antibacterial substance called 'florin'[240]. This inhibits the growth of a number of gram-positive and gram-negative bacteria in as low a concentration as 30 ppm[240].

nrakta Europe, including Britain, from Scandinavia south and east to Spain, Greece and S.W. Asia. ksacta Woods, scrub and hedges, especially in oak woods, on neutral to calcareous soils[9, 17, 200].

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

nwatta An easily grown plant, it succeeds in most fertile soils, including heavy ones, preferring a moisture retentive well-drained loamy soil[1, 98, 200]. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[186, 200]. Fairly tolerant of cutting, it succeeds in a mixed hedgerow[186]. A parent of the cultivated apple[11], it is often used as a rootstock[50]. The fruit is a good wildlife food source, especially for birds[200]. The plant has over 90 associated insect species[24]. Hybridizes freely with other members of this genus[200]. Plants in this genus are notably susceptible to honey fungus[200].

5.2.147 Taxus cuspidata

Japanese Yew

4 tin 7 cyuc 3 ckak 2 tcan 4 dwat 10 m hkuc
pcimhmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli frusflatprikliwv hpa7tmwatli nyanhjen hjonli

drutta Taxus cuspidata is an evergreen Tree growing to 10 m (32ft) by 10 m (32ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf all year, and the seeds ripen from September to November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate atmospheric pollution.

pcista All parts of the plant, except the flesh of the fruit, are highly poisonous[1, 4, 7, 10, 19, 65].

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or made into jam[105, 183]. Very sweet and gelatinous, most people find it delicious though some find it sickly. The fruit is a fleshy berry about 8mm in diameter and containing a single seed[200]. All other parts of this plant, including the seed, are highly poisonous. When eating the fruit you should spit out the large seed found in the fruit's centre. Should you swallow the whole seed it will just pass straight through you without harm, if the seed has been bitten into, however, it could cause some problems.

tcanta Dye WoodA brown dye is obtained from the heartwood[46, 61]. Red according to another report[266]. An oil is extracted from the seeds[266]. Wood - hard, strong, elastic, fine grained, takes a beautiful polish. Used for furniture, bows etc[1, 46, 61]. The wood is used in building construction, furniture manufacture and as a carving material[266].

dwatta CancerModern research has shown that yew trees contain the substance 'taxol' in their shoots and bark. Taxol has shown exciting potential as an anti-cancer drug, particularly in the treatment of ovarian cancers[218, 238]. This remedy is very toxic and, even when used externally, should only be used under the supervision of a qualified practitioner[238]. See also the notes above on toxicity. A compound used to treat diabetes is extracted from the wood, bark, leaves, and roots[266].

nrakta E. Asia - China, Japan, eastern Russia. ksacta Mountains throughout Japan[58]. Acid soils in cold, humid places at elevations of 500 - 1000 metres in Heilongjiang, E Jilin, Liaoning and Shaanxi provinces, China[266].

propta Seed - can be very slow to germinate, often taking 2 or more years[78, 80]. It is best sown as soon as it is ripe in the autumn when it should germinate 18 months later. Stored seed may take 2 years or more to germinate. 4 months warm followed by 4 months cold stratification may help reduce the germination time[113]. Harvesting the seed 'green' (when fully developed but before it has dried on the plant) and then sowing it immediately has not been found to reduce the germination time because the inhibiting factors develop too early[80]. Prick out the seedlings into individual pots once they are large enough to handle and grow them on in pots in a cold frame. The seedlings are very slow-growing and will probably require at least 2 years of pot cultivation before being large enough to plant out. Any planting out is best done in late spring or early summer, after the last expected frosts[K]. Cuttings of half-ripe terminal shoots, 5 - 8cm long, July/August in a shaded frame. Should root by late September but leave them in the frame over winter and plant out in late spring[78]. High percentage[11]. Cuttings of ripe terminal shoots, taken in winter after a hard frost, in a shaded frame[113].

nwatta Landscape Uses:Hedge, Screen, Superior hedge, Specimen. Thrives in almost any soil, acid or alkaline, as long as it is well-drained[1, 200]. Succeeds in dry soils[188]. Very shade tolerant[81]. The dormant plant is hardy to about -35°C[200] but it requires more summer heat and humidity than *T. baccata* and is rarely more than a shrub in Britain[81]. Young shoots can be damaged by late spring frosts. The foliage may turn reddish-brown in cold winters[81]. There are several named varieties selected for their ornamental value[188]. Plants produce very little fibrous root and should be planted in their final positions when still small[200]. Plants in this genus are notably resistant to honey fungus[200]. Dioecious. Male and female plants must be grown if fruit and seed is required. Female plants fruit freely in Britain if they are pollinated[11, 185]. Special Features:Not North American native, All or parts of this plant are poisonous, Inconspicuous flowers or blooms.

5.2.148 Juniperus communis

Juniper, Common juniper

4 tin 10 cyuc 3 ckak 4 tcan 3 dwat 9 m hkuc
hminhtut cyutli hgtaktyuctcup hwicli hysihrasjlutnyikfrp hpa7tli frusflatprikliwv hpa7tmwatli nyanhjen hjonli

drutta Juniperus communis is an evergreen Shrub growing to 9 m (29ft) by 4 m (13ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 2 and is not frost tender. It is in leaf all year; in flower from May to June, and the seeds ripen in October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

if given 2 weeks warm then 14 - 16 weeks cold stratification[98], so sow it as early in the year as possible. Prick out the seedlings into individual pots when they are large enough to handle. Seedlings are very slow to put on top-growth for their first year or two[11], but they are busy building up a good root system. It is best to keep them in pots in a cold frame for their first winter and then plant them out into their permanent positions in late spring.

nwatta Succeeds in most reasonably good soils in an open sunny position[11]. Tolerates light shade[188], though it fruits better in a sunny position[K]. This species grows best in S.W. England[121]. Plants are susceptible to fire-blight[188]. Closely related to *S. cuspidata*[121] and to *S. aria*[200].

5.2.145 *Crataegus punctata*

Dotted Hawthorn,
4 tin 8 cyuc 3 kcaak 2 tcan 2 dwat 10 m hku
c pchmimht cyuti hgtaccuphja7n hwicli hrasjlutnykrip hpa7tli flatprikwissip hpa7tmwatli xre7t hjonli

drutta *Crataegus punctata* is a deciduous Tree growing to 10 m (32ft 10in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in June, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[159]. Eaten out of hand or made into jellies, preserves etc[177, 183]. A good size, about 25mm in diameter, and borne in small clusters[200]. Ripening in October, it is quite apple-like in texture and appearance, making a good dessert fruit[K]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta MiscellanyWood - heavy, hard, tough, close-grained. Useful for making tool handles, mallots and other small items[82].

dwatta Cardiotonic Hypotensive MiscellanyA compound decoction of the shoots and bark has been used to stop menstrual flow[257]. Although no other specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta Eastern N. America - Quebec to Georgia, west to Minnesota and Oklahoma. ksacata Open rocky ground, thickets and pasture[43]. Rich hillsides[82].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but

undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. A very ornamental plant[1], it grows very well in Britain, flowering and fruiting abundantly[11]. There are some named varieties selected for their ornamental value[200]. 'Ohio Pioneer' is a thornless form growing about 8 metres tall[200]. The plant is heat tolerant in zones 7 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone 11-11 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

5.2.146 *Malus sylvestris*

Crab Apple, European crab apple
4 tin 8 cyuc 3 kcaak 0 tcan 2 dwat 10 m hku
c hmimht cyuti tcup hwicli hrasjlutnykrip hpa7tli flatprikwis hpa7tmwatli xre7t hjonli

drutta *Malus sylvestris* is a deciduous Tree growing to 10 m (32ft 10in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in May, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

kcakta Edible Parts: Fruit OilEdible Uses: Oil Pectin Pectin TeaFruit - raw or cooked[9, 15]. Used for jellies, preserves and juices[183]. The flavour improves considerably if the fruit is not harvested until it has been frosted[12]. The fruit is quite variable in size (it is about 2 - 4cm in diameter[200]) and quality. Whilst usually harsh and acid, some forms are quite sweet and can be eaten out of hand[K]. The fruit is rich in pectin and can be used in helping other fruits to set when making jam etc[61, 142]. Pectin is also said to protect the body against radiation[201]. An edible oil can be obtained from the seed[4]. It would only really be viable to

5.2.137 *Hydrangea anomala*

Hydrangea
4 tin 8 cyuc 3 kcaak 0 tcan 12 dwat 12 m hku
c pchmimht cyuti tcup hwicli hrasjlutnyk hpa7tli frusflatprikkwis hpa7tmwatli xre7t hjonli

drutta *Hydrangea anomala* is a deciduous Climber growing to 12 m (39ft 4in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to July, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

kcakta Edible Parts: Leaves SapEdible Uses: Condiment SweetenerLeaves - cooked. A cucumber taste[183]. The Japanese crush the leaves and use them fresh with miso[177, 183]. A boiled concoction of the leaves is used to make a syrup[177, 183]. The sweet sap is used as a drink[183].

tcanta PaperThe bark is a paper substitute[146, 158]. The sub-species *H. anomala petiolaris* can be used as a ground cover plant in a shady position[188]. It is best spaced about 1.8 metres apart each way[208].

dwatta The leaves are used medicinally[266]. No further information is given.

nrakta E. Asia - China to the Himalayas. ksacata Shady ravines to 2100 metres in the Himalayas[158]. Dense to sparse forests in valleys, along stream banks, or on rocky mountain slopes at elevations of 500 - 2900 metres[266].

propta Seed - surface sow in a greenhouse in spring[113]. Cover the pot with paper until the seed germinates[78]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 8cm long, July/August in a frame. Overwinter in a greenhouse and plant out in late spring[78]. Cuttings of mature wood in late autumn in a frame[200]. Mound layering in spring. Takes 12 months[78]. Basal softwood cuttings of non-flowering shoots[200]. Leaf-bud cuttings of the current seasons growth in a frame[200].

nwatta Landscape Uses:Arbor, Espalier. Tolerates most soils[200], thriving in a well-drained loamy soil[1], but resenting dryness at the roots[11, 200]. Succeeds in full sun or semi-shade[200], but if it is grown in a low rainfall area then it requires shade at the hottest part of the day[11]. Does well on very acid soils with a pH around 4.5[200]. The colour of the flowers reflects the pH of the soil the plant is growing in, the flowers are pink in a neutral to alkaline soil and blue in an acid soil. Although the dormant plant is quite hardy in Britain, the young growth in spring can be damaged by late frosts. A fast-growing self-clinging climbing plant[208], attaching itself by means of aerial roots[200], and growing up walls or tree trunks on any aspect. The plants may need initial support, however[200]. Plants are growing well on a wall at Kew[11]. Grows well on north walls but prefers a sunnier position[208]. Closely related to *H. petiolaris*[11]. *H. petiolaris* is normally treated as no more than a sub-species of this species[200]. This species is notably susceptible to honey fungus[200]. Special Features: Not North American native, Blooms are very showy.

5.2.138 *Sorbus aria*

Whitebeam, Chess-apple
4 tin 8 cyuc 3 kcaak 4 tcan 1 dwat 12 m hku
c hmimht cyuti tcup hwicli hrasjlutnykrip hpa7tli frusflatprikkwissip hpa7tmwatli xre7t hjonli

drutta *Sorbus aria* is a deciduous Tree growing to 12 m (39ft) by 8 m (26ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to June, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow

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

pcista The seeds probably contain hydrogen cyanide. This is the ingredient that gives almonds their characteristic flavour. Unless the seed is very bitter it should be perfectly safe in reasonable quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked and used in preserves etc. The fruit is usually blebbed if it is going to be eaten raw[2, 3, 5, 105, 115, 183]. This involves storing the fruit in a cool dry place until it is almost but not quite going rotten. At this stage the fruit has a delicious taste, somewhat like a luscious tropical fruit[K]. Fruit from some trees has a pleasant mild flavour and a mealy texture, we like eating small quantities of it. The fruit can also be dried and ground into a powder and mixed with cereals such as wheat[2, 46, 66]. The fruit is about 10 - 12mm across[200].

tcanta Pioneer Shelterbelt WoodVery tolerant of exposed maritime conditions, it makes a good windbreak tree near the coast[75, 200]. A useful pioneer species, especially on chalky soils and in windy situations[186, K]. Wood - hard, heavy, close grained. Used for beams etc[11, 115].

dwatta Diuretic Emmenagogue LaxativeBoth the flowers and the fruit are mildly diuretic, laxative and emmenagogue[9]. An infusion is used in the treatment of painful menstruation, constipation and kidney disorders[9].

nrakta Central and S. Europe, from Britain and France to Spain, east to Macedonia and Transylvania. ksacata Woods and scrub, usually on chalk or limestone[3, 9, 13, 17].

propta Seed - best sown as soon as it is ripe in a cold frame[78, 80]. If you have sufficient seed it can be sown in an outdoor seedbed[78, 80]. Stored seed germinates better if given 2 weeks warm then 14 - 16 weeks cold stratification[98], so sow it as early in the year as possible. Prick out the seedlings into individual pots when they are large enough to handle. Seedlings are very slow to put on top-growth for their first year or two[11], but they are busy building up a good root system. It is best to keep them in pots in a cold frame for their first winter and then plant them out into their permanent positions in late spring.

nwatta Succeeds in most reasonably good soils in an open sunny position[11]. Tolerates acid sands and thin chalky soils[98, 200]. Does well on heavy clays[200]. Tolerates light shade[188], though it fruits better in a sunny position[K]. Very tolerant of atmospheric pollution and of exposed maritime positions[186]. The whitebeam is one of the first colonizers of chalk scrub[186]. As well as being a good pioneer species for this situation, it will often survive through the development to woodland[186]. There are several named varieties selected for their ornamental value[188]. Trees cast a fairly dense shade when mature[186]. Regenerating well after cutting, it is suitable for coppicing[186]. The fruit is very attractive to birds[11]. Plants are susceptible to fire-blight[188]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

5.2.139 *Viburnum rufidulum*

Southern Black Haw, Rusty blackhaw
4 tin 8 cyuc 3 kcaak 0 tcan 1 dwat 12 m hku
c hmimht cyuti tcup hwicli hrasjlutnykrip hpa7tli flatprikkwis hpa7tmwatli dyatxre7t hjonli

drutta *Viburnum rufidulum* is a deciduous Shrub growing to 12 m (39ft 4in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in June, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow

in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[183]. The fleshy fruit has a sweet taste, somewhat like raisins[274], but it is nearly all seed[43, 159]. The taste is best after a frost. The ellipsoid fruit is up to 15mm long and contains a single large seed[229].

tcanta WoodWood - fine-grained, heavy, hard, strong, with a disagreeable odour[227]. Of no particular value[227]. dwatta AntispasmodicThe bark is antispasmodic and has been used in the treatment of cramps and colic[254].

nrakta Southern N. America - Virginia to Florida, west to Texas, Oklahoma and Kansas. ksacta Moist woods and thickets[43, 159]. By the sides of streams, hillsides, roadsides, woodland margins and clearings[229]. Also found in dry upland woods[82].

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

nwatta An easily grown plant, it succeeds in most soils but is ill-adapted for poor soils and for dry situations[1]. It prefers a deep rich loamy soil in sun or semi-shade[11, 200]. Best if given shade from the early morning sun in spring[200]. A fast-growing but short-lived species in the wild[229]. Plants grow well but do not flower very freely in Britain[11]. Plants are self-incompatible and need to grow close to a genetically distinct plant in the same species in order to produce fruit and fertile seed[11, 200].

5.2.140 Smilax rotundifolia

Horse Brier, Roundleaf greenbrier, Brambles
4 tin 9 cyuc 3 kcaak 0 tcan 2 dwat 12 m hkuc
hmimhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatprklkwis hpa7tmwatli nyanhjen hjonli

drutta Smilax rotundifolia is a deciduous Climber growing to 12 m (39ft 4in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in June. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). . The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves RootEdible Uses: Drink-Root - cooked[2, 102, 161, 257]. Rich in starch[105]. The root can be dried and ground into a powder that is used in making cakes, puddings, sweet drinks etc[46, 183], it can also be made into a jelly or eaten in soups[159]. A beer resembling root beer or sarsaparilla is made from the roots[183]. Young shoots - raw or cooked[62, 102, 105, 159]. They can be added to salads or cooked like asparagus[183].

dwatta Birthing aid Poultice RubefacientThe stem prickles have been rubbed on the skin as a counter-irritant to relieve localised pains, muscle cramps and twitching[222]. A tea made from the leaves and stems has been used in the

treatment of rheumatism and stomach problems[222]. The parched and powdered leaves have been used as a dressing on burns and scalds[257]. The wilted leaves have been used as a poultice on boils[222, 257]. A tea made from the roots is used to help the expelling of afterbirth[222]. Reports that the roots contain the hormone testosterone have not been confirmed, they might contain steroid precursors, however[222].

nrakta Eastern N. America - Nova Scotia to Florida, west to Texas and Illinois. ksacta Moist to dryish thickets and woods[43]. Considered to be an obnoxious pest in America[43].

propta Seed - sow March in a warm greenhouse[1]. This note probably refers to the tropical members of the genus, seeds of plants from cooler areas seem to require a period of cold stratification, some species taking 2 or more years to germinate[K]. We sow the seed of temperate species in a cold frame as soon as we receive it, and would sow the seed as soon as it is ripe if we could obtain it then[K]. When the seedlings eventually germinate, prick them out into individual pots when they are large enough to handle and grow them on in the greenhouse for at least their first year, though we normally grow them on in pots for 2 years. Plant them out into their permanent positions in early summer. Division in early spring as new growth begins[238]. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer. Cuttings of half-ripe shoots, July in a frame[238].

nwatta Succeeds in most soils in sun or semi-shade[1, 200]. A very free growing plant, it can be used to clamber over large trees, shrubs or tree stumps[1, 200]. Hardy to about -20°C[200]. Dioecious. Male and female plants must be grown if seed is required. Special Features:North American native, Invasive, Naturalizing, Attractive flowers or blooms.

5.2.141 Sorbopyrus species

4 tin 8 cyuc 3 kcaak 0 tcan 0 dwat 10 m hkuc
hmimhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatprklkwis hpa7tmwatli xre7t hjonli

drutta Sorbopyrus species is a deciduous Tree growing to 10 m (32ft 10in). See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf from May to November, in flower in April, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Fruit - raw or cooked[183].

nrakta A bi-generic hybrid of garden origin. ksacta Not known in the wild.

propta Seed - best sown in a cold frame as soon as it is ripe if this is possible, otherwise in late winter. The plant produces very little fertile seed, and this does not breed true[200], though some interesting plants might be produced[K]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Grafting is the best method of propagating this plant. This is best carried out in early spring, though budding can be carried out in the summer.

nwatta Succeeds in a well-drained moisture-retentive soil in an open sunny position[200]. Succeeds in light shade but fruits less well in such a position. This species is a bi-generic hybrid of garden origin between a Sorbus species and Pyrus communis[183].

5.2.142 Arundinaria spp

Running Bamboo
4 tin 10 cyuc 3 kcaak 4 tcan 1 dwat 10 m hkuc
pcimhmimhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatprklkwis hpa7tmwatli hjonli

drutta Arundinaria spp is an evergreen Bamboo growing to 10 m (32ft) by 3 m (9ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. Suitable for: light

(sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

kcakta Edible Parts: Seed ShootsEdible Uses: Young shoots - cooked[11, 22, 46, 105, 183]. Used as a pot-herb[236]. Seed - cooked[46, 61, 161]. It can be used as a wheat substitute[2, 105], for which it is not much inferior[213], but it is rather small and difficult to collect in quantity[159]. The plants only flower at irregular intervals of several years. See individual species for more information.

tcanta FodderAgroforestry Uses: With its extensive running root system, the plant is ideal for helping to control soil erosion, especially along the sides of rivers[352]. The extensive growth of the plant provides streambank stabilization, sediment retention, and bioaccumulation of nutrients and toxins[1050]. So long as it can be restrained, the plant makes an excellent, dense hedge or screen[352]. The canes are used as pipe-stems, are woven into baskets and mats plus a variety of other purposes[169, 236]. The hollow stems can be made into flutes[257]. Carbon Farming Solutions - Industrial Crop: biomass (Crops grown for non-food uses. Industrial crops provide resources in three main categories: materials, chemicals, and energy. Traditional materials include lumber and thatch, paper and cardboard, and textiles) [1-1]. Fodder: bank.

dwatta See individual species.

nrakta Asia, North America ksacta Forms dense thickets along riverbanks, in swamps and low woods[43, 235]. Found on all types of soil; at elevations from sea level to 600 metres[195].

propta Seed - surface sow as soon as it is ripe in a greenhouse at about 20°C. Do not allow the compost to dry out. Germination usually takes place fairly quickly so long as the seed is of good quality, though it can take 3 - 6 months. When large enough to handle, prick the seedlings out into individual pots and grow them on in a lightly shaded place in the greenhouse until large enough to plant out. Bamboos only flower at intervals of several years and so seed is rarely available. Division in late spring as new growth commences. Take divisions with at least three canes in the clump, trying to cause as little root disturbance to the main plant as possible. Grow them on in light shade in a greenhouse in pots of a high fertility sandy medium. Mist the foliage regularly until plants are established. Plant them out into their permanent positions when a good root system has developed, which can take a year or more[200]. Rhizome cuttings. Basal cane cuttings.

nwatta Fodder: Bank Industrial Crop: Biomass Management Managed Multistem Minor Global CropThere are three recognized species of the genus Arundinaria accepted: Arundinaria appalachiana Triplett, Weakley and L.G.Clark - Hill cane, Arundinaria gigantea (Walt.) Muhl. - River cane, Arundinaria tecta Muhl. - Switch cane. Climate: cold to warm temperate. Humidity: humid. Carbon Farming Solutions - Managed bamboo forest sequester more carbon than wild bamboo and the same as fast-growing tropical trees like eucalyptus. Cultivation: minor global crop. Management: managed multistem (Describes the non-destructive management systems that are used in cultivation) [1-1].

5.2.143 Malus floribunda

Japanese Crab, Japanese flowering crab apple
4 tin 7 cyuc 3 kcaak 0 tcan 0 dwat 10 m hkuc
hmimhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatprklkwis hpa7tmwatli xre7t hjonli

drutta Malus floribunda is a deciduous Tree growing to 10 m (32ft) by 10 m (32ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All members of this genus contain the toxin hydrogen cyanide in their seeds and possibly also in their leaves,

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

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105]. Up to 1cm in diameter[200]. It tastes like a soft fruit. Acid but nice, about the size of a large blackcurrant[K].

nrakta E. Asia - Japan? Probably not a truly wild species but a hybrid M. sieboldii x M. baccata or M. prun ksacta Not known in the wild.

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

nwatta Landscape Uses:Border, Espalier, Pest tolerant, Standard, Specimen, Street tree. An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade, though it fruits less well in such a situation[200]. A very ornamental plant[1], the fruit is a good wildlife food source, especially for birds[200]. Hybridizes freely with other members of this genus[200]. The tree is a very good pollinator for the apple orchard[200]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features:Not North American native, Fragrant flowers, Attractive flowers or blooms.

5.2.144 Sorbus lanata

4 tin 8 cyuc 3 kcaak 0 tcan 0 dwat 10 m hkuc
hmimhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatprklkwis hpa7tmwatli xre7t hjonli

drutta Sorbus lanata is a deciduous Tree growing to 10 m (32ft 10in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

pcista The seeds probably contain hydrogen cyanide. This is the ingredient that gives almonds their characteristic flavour. Unless the seed is very bitter it should be perfectly safe in reasonable quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[272]. The fruit is usually bletted if it is going to be eaten raw[2, 51, 146, 158]. This involves storing the fruit in a cool dry place until it is almost but not quite going rotten. At this stage the fruit has a delicious taste, somewhat like a luscious tropical fruit[K]. The fruit is about 1.2 - 3cm across[200] and is borne in bunches which makes harvesting easier[K].

tcanta WoodWood - moderately hard, close and even grained, seasons well[146].

nrakta E. Asia - Himalayas. ksacta Forests to 3400 metres[51]. Characteristic of high-level grazing pastures[158].

propta Seed - best sown as soon as it is ripe in a cold frame[78, 80]. If you have sufficient seed it can be sown in an outdoor seedbed[78, 80]. Stored seed germinates better

den[K]. Plants seem to be immune to the predations of rabbits[233]. This species is closely related to *P. viviparum*[1] and *P. bistorta*[200]. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

5.2.240 Oxalis violacea

Violet Wood Sorrel
4 tin 8 cyuc 3 kcaak 0 tcan 1 dwat 0.3 m hkuc
hmimht cyuti kyucup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Oxalis violacea* is a BULB growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

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

kcakta Edible Parts: Flowers Leaves RootEdible Uses: DrinkLeaves - raw or cooked[2, 105, 159, 161]. The acid salty leaves are eaten raw in salads and sandwiches or cooked as a potherb[183]. Use in moderation, see notes at top of sheet. Flowers - raw[105, 161]. An attractive and tasty garnish for salads[183]. Root - raw or cooked[105, 161, 183, 257]. A lemon-flavoured drink is made from the leaves[159].

dwatta Anthelmintic Antiemetic Blood purifier Cancer SalveThe plant is anthelmintic, antiemetic, blood purifier, cancer and salve[257]. A cold infusion is used to stop a person vomiting[257]. An infusion can be used as a blood purifier, it is said to be a treatment in the early stages of cancer[257]. An infusion of the plant is drunk and also used as a wash in treating children with hookworm[257]. An infusion of the leaves, mixed with oil, can be used as a salve on sores[257].

nrakta Eastern N. America - New York to Wisconsin, south to Florida. ksacta Woods, shaded slopes, gravelly banks and prairies[43]. Dry sandy or clay soils[159].

propta Seed - best sown as soon as it is ripe in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in late spring or early summer. Division in spring. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Easily grown in a moisture-retentive humus-rich soil in shade or dappled sunlight[200]. Succeeds in dry soils[159]. Grows well in a wild or woodland garden[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2].

5.2.241 Chenopodium foliosum

Leafy goosefoot
4 tin 8 cyuc 3 kcaak 0 tcan 0 dwat 0.6 m hkuc
htut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Chenopodium foliosum* is an ANNUAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to October, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista The leaves and seeds of all members of this genus are more or less edible. However, many of the species in this genus contain saponins, though usually in quantities too small to do any harm. Although toxic, saponins are poorly absorbed by the body and most pass straight through without any problem. They are also broken down to a large extent in the cooking process. Saponins are found in many foods, such as some beans. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K]. The plants also contain some oxalic acid, which in large quantities can lock up some of the nutrients in the food. However, even considering this, they are very nutritious vegetables in reasonable quantities. Cooking the plants will reduce their content of oxalic acid. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Edible Parts: Fruit Leaves SeedEdible Uses: Leaves - cooked and used like spinach[61, 74, 177]. The raw leaves should only be eaten in small quantities, see the notes above on toxicity. Seed - ground into a powder and cooked. It can be added to cereal flours and used in making bread. Very small and fiddly, the seed is about 1mm in diameter[266]. Soak the seed for 12 hours and then thoroughly rinse it in order to wash off any saponins before grinding it[K]. Fruit - raw. Fairly insipid, though quite attractive to look at[K]. The fruit is about 12mm in diameter[200].

tcanta DyeGold/green dyes can be obtained from the whole plant[168].

nrakta S. Europe to N. Africa and Asia. ksacta Waste places and waysides[100]. Slopes, forest margins and valleys in northern Tibet[266].

propta Seed - sow spring in situ. Most of the seed usually germinates within a few days of sowing.

nwatta An easily grown plant, succeeding in most soils but disliking shade[1, 200]. It prefers a moderately fertile soil[200]. Formerly cultivated for its edible leaves[61]. This species is closely related to *C. capitatum*[200].

5.2.242 Polygonum bistorta

Bistort, Meadow bistort, Snakeweed
4 tin 7 cyuc 3 kcaak 2 tcan 3 dwat 0.5 m hkuc
hmimht cyutli tcuphja7n hwicli hrasljutnyik hpa7tli frusflatprikliwis hpa7tmwatli xre7t hjonli

drutta *Polygonum bistorta* is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.5 m (1ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from June to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

pcista Although no specific mention has been made for this species, there have been reports that some members of this genus can cause photosensitivity in susceptible people. Many species also contain oxalic acid (the distinctive lemony flavour of sorrel) - whilst not toxic this substance can bind up other minerals making them unavailable to the body and leading to mineral deficiency. Having said that, a number of common foods such as sorrel and rhubarb contain oxalic acid and the leaves of most members of this genus are nutritious and beneficial to eat in moderate quantities. Cooking the

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

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: Fruit Oil SeedEdible Uses: Condiment OilFruit - raw or cooked[2, 105]. A good size, it is about 25mm x 25mm and contains one large seed[200]. Sour and scarcely edible[11, 266]. The fruit is occasionally eaten. Seed - raw or cooked. A bitter taste[11], they are normally used as an almond flavouring[74, 105]. Do not eat the seed if it is too bitter - see the notes above on toxicity. An edible oil is obtained from the seed[183] - it is used as an almond flavouring[74]. The oil resembles olive oil[183].

tcanta Dye Oil RootstockA potential rootstock for apricots[113]. A green dye can be obtained from the leaves[168]. A dark grey to brown dye can be obtained from the fruit[168].

dwatta Analgesic Antiasthmatic Antiseptic Antitussive Digestive Emollient Laxative TonicThe seed is analgesic, antiasthmatic, antiseptic, antitussive and emollient[176]. It is used in the treatment of coughs, asthma, acute or chronic bronchitis and constipation[176]. The seed contains amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta E. Asia - China, Korea, Mongolia and eastern Siberia. ksacta Dry sunny slopes amongst shrubs[74]. Forests, thickets, hill grasslands, river valleys and dry sunny slopes at elevations of 400 - 2500 metres[266].

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200]. Softwood cuttings from strongly growing plants in spring to early summer in a frame[200]. Layering in spring.

nwatta Industrial Crop: Oil Management: Standard Regional Crop Staple Crop: OilThrives in a well-drained moisture-retentive loamy soil, growing well on limestone[11, 200]. Prefers some lime in the soil but is likely to become chlorotic if too much lime is present[1]. Succeeds in sun or partial shade though it fruits better in a sunny position[11, 200]. This species is reputed to be hardy to about -50°C and as such is of potential use for conferring greater cold tolerance in breeding programmes with the closely related apricot, *P. armeniaca*. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. Plants in this genus are notably susceptible to honey fungus[200].

5.2.176 Corylus americana

American Hazel
4 tin 8 cyuc 3 kcaak 2 tcan 1 dwat 3 m hkuc
hmimht cyuti tcup hwicli hrasljutnyik hpa7tli flatprikliwisslip hpa7tmwatli fyif hjonli

drutta *Corylus americana* is a deciduous Tree growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from April to May, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium

(loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

kcakta Edible Parts: Oil SeedEdible Uses: OilSeed - raw or cooked in soups, bread, biscuits, sweets etc[63, 101, 183]. The nuts have a thick shell with a small sweet kernel[183], they make an excellent dessert[K]. Although smaller than the seeds of cultivated species, the seed is of the same general quality[270]. Nuts at the 'milk' stage (before they are fully ripe) are softer and sweeter[183]. The seed is rich in oil. The seed ripens in mid to late autumn and will probably need to be protected from squirrels[K]. When kept in a cool place, and not shelled, the seed should store for at least 12 months[K]. An edible oil is obtained from the seed, tcanta Hedge Hedge OilThe plant makes a good screening hedge[159].

dwatta Astringent PoulticeA tea made from the bark is astringent[222]. It was used in the treatment of hives and fevers[222, 257]. A poultice made from the bark is used to close cuts and wounds, treat tumours, old sores etc[222, 257].

nrakta Eastern N. America - Maine to Georgia, west to Saskatchewan and Oklahoma. ksacta Thickets and rich woods[43, 159]. Moist to dry open woods and thickets, hillsides, roadsides, fencerows, and waste place from sea level to 750 metres[270].

propta Seed - best sown as soon as it is harvested in autumn in a cold frame[164]. Germinates in late winter or spring. Stored seed should be pre-soaked in warm water for 48 hours and then given 2 weeks warm followed by 3 - 4 months cold stratification[164]. Germinates in 1 - 6 months at 20°C[164]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame or sheltered place outdoors for their first winter. Plant them out into their permanent positions in late spring or early summer[K]. Layering in autumn. Easy, it takes about 6 months[78, 200]. Division of suckers in early spring. Very easy, they can be planted out straight into their permanent positions.

nwatta An easily grown plant, it succeeds in most soils including chalk, but is in general more productive of seeds when grown on soils of moderate fertility[11, 200]. It does well in a loamy soil[11, 200]. Plants are fairly wild tolerant[1, 11]. This species is cultivated in America for its edible seed, there are some named varieties[61, 183]. This species is of little value in Britain, however, rarely bearing seeds[11]. Members of this genus bear transplanting well and can be easily moved even when relatively large[11]. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A clumping plant, forming a colony from shoots away from the crown but with a limited spread [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

5.2.177 Crataegus intricata

Copenhagen hawthorn
4 tin 8 cyuc 3 kcaak 3 tcan 2 dwat 3 m hkuc
hmimht cyuti hgattcuphja7n hwicli hrasljutnyikfrp hpa7tli flatprikliwisslip hpa7tmwatli xre7t hjonli

drutta *Crataegus intricata* is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Midgees. Suitable for: light (sandy), medium

(loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw, cooked or dried for later use[2, 105, 161]. Hard dry flesh[43]. Fruit we have eaten from this tree is mealy and fairly soft, with a pleasant sweet flavour[K]. It ripens in early September in southern Britain[K]. The fruit is up to 14mm in diameter and is borne in small clusters[229]. The skin is slightly hairy[235]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta Eastern N. America - Maine to Georgia, west to Michigan and Oklahoma. **ksacta Thickets** and open rocky woods[43, 235].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

5.2.178 Corylus cornuta

Beaked Hazel, California hazelnut, Turkish Filbert, Turkish Hazel

4 tin 7 cyuc 3 kcaak 3 tcan 1 dwat 3 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli fyif hjonli

drutta Corylus cornuta is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from April to May, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

kcakta Edible Parts: Oil SeedEdible Uses: OilSeed - raw or cooked[2, 62, 101]. Very popular in America, the seed is sweet and well-flavoured with a thin shell[2, 85]. The seed can be dried and ground into a powder which is added to cereals and used in making bread, pies etc[85, 183]. The seed ripens in mid to late autumn and will probably need to be protected from squirrels[K]. When kept in a cool place, and not shelled, the seed should store for at least 12 months[K]. An edible oil is obtained from the seed.

tcanta Basketry Dye Oil StringYoung sucker shoots are used to make a rope[99]. The shoots are soaked in urine first, to make them more pliable[257]. A blue dye is obtained from the root or inner bark[99, 101]. The branches are used in basketry[160].

dwatta Cardiac Odontalgic StomachicAn infusion of the branches and leaves has been used in the treatment of heart complaints and intestinal disorders[257]. A decoction of the bark has been given to children to alleviate teething pain[257].

nrakta Eastern and Central N. America. **ksacta Dry** or moist woodland on hills or mountain slopes[62]. Rich thickets, clearings and woodland edges[43].

propta Seed - best sown as soon as it is harvested in autumn in a cold frame[164]. Germinates in late winter or spring. Stored seed should be pre-soaked in warm water for 48 hours and then given 2 weeks warm followed by 3 - 4 months cold stratification[164]. Germinates in 1 - 6 months at 20°C[164]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame or sheltered place outdoors for their first winter. Plant them out into their permanent positions in late spring or early summer[K]. Layering in autumn. Easy, it takes about 6 months[78, 200]. Division of suckers in early spring. Very easy, they can be planted out straight into their permanent positions.

nwatta Landscape Uses:Firewood, Specimen, Street tree. An easily grown plant, it succeeds in most soils, but is in general more productive of seeds when grown on soils of moderate fertility[11, 200]. It does less well in rich heavy soils or poor ones[11, 63]. Does well in a loamy soil[11]. Very suitable for an alkaline soil[11], but it dislikes very acid soils[17]. Tolerates a pH in the range 5.8 to 7.5. Plants are fairly wind tolerant[1, 11]. Plants are hardy to about -30°C[160]. They thrive in a short growing season[160]. This species is occasionally cultivated for its edible seed in N. America[61] but is of no value in Britain as a seed bearer[11]. Plants can bear fruit in 5 - 6 years from seed[160]. Members of this genus bear transplanting well and can be easily moved even when relatively large[11]. Special Features:Not North American native, Inconspicuous flowers or blooms. The plant is heat tolerant in zones 7 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A clumping plant, forming a colony from shoots away from the crown but with a limited spread [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

female plants must be grown if seed is required), and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

pcista Although the fruit of this plant is quite often used medicinally and as a flavouring in various foods and drinks, large doses of the fruit can cause renal damage. Juniper should not be used internally in any quantities by pregnant women[65, 165].

kcakta Edible Parts: FruitEdible Uses: Coffee Condiment TeaFruit - raw or cooked[2, 5, 9, 15]. It is usually dried [12]. The fruit is often used as a flavouring in sauerkraut, stuffings, vegetable pates etc, and is an essential ingredient of gin[183]. The aromatic fruit is used as a pepper substitute according to one report[183]. An essential oil is sometimes distilled from the fruit to be used as a flavouring[183]. Average yields are around 1%[7]. The cones are about 4 - 8mm in diameter and take 2 years to mature[200]. Some caution is advised when using the fruit, see the notes above on toxicity. The roasted seed is a coffee substitute[177]. A tea is made by boiling the leaves and stems[161]. A tea made from the berries has a spicy gin-like flavour[183].

tcanta Fibre Fuel Hair Incense Repellent Resin Strewing TindarA decoction of the branches is used as an anti-dandruff shampoo[172]. Yields the resin 'Sandarac', used in the production of a white varnish[74]. The stems were at one time used as a strewing herb[14]. The whole plant can be burnt as an incense and fumigant[66, 102, 146]. It makes a good insect repellent[102, 172]. The bark is used as cordage[61] and as a tinder[172]. An excellent fuel wood[66]. Many forms of this species are good ground cover plants for sunny situations[208].

dwatta Antiseptic Aromatic Carminative Diaphoretic Diuretic Rubefacient Stomachic Tonic UrinaryJuniper fruits are commonly used in herbal medicine, as a household remedy, and also in some commercial preparations. They are especially useful in the treatment of digestive disorders plus kidney and bladder problems[4]. The fully ripe fruits are strongly antiseptic, aromatic, carminative, diaphoretic, strongly diuretic, rubefacient, stomachic and tonic[4, 7, 9, 21, 46, 165, 240, 254]. They are used in the treatment of cystitis, digestive problems, chronic arthritis, gout and rheumatic conditions[254]. They can be eaten raw or used in a tea[222], but some caution is advised since large doses can irritate the urinary passage[4]. Externally, it is applied as a diluted essential oil, having a slightly warming effect upon the skin and is thought to promote the removal of waste products from underlying tissues[254]. It is, therefore, helpful when applied to arthritic joints etc[254]. The fruits should not be used internally by pregnant women since this can cause an abortion[9]. The fruits also increase menstrual bleeding so should not be used by women with heavy periods[254]. When made into an ointment, they are applied to exposed wounds and prevent irritation by flies[4]. The essential oil is used in aromatherapy. Its keyword is "Toxin elimination"[210].

nrakta Northern temperate zone, incl Britain, south to the mountains of N. Africa, Himalayas and California **ksacta Rocks** and moors on mountains and lowland bogs in N. Wales, N. England and Scotland[17].

propta The seed requires a period of cold stratification. The seed has a hard seedcoat and can be very slow to germinate, requiring a cold period followed by a warm period and then another cold spell, each of 2 - 3 months duration[78, 81]. Soaking the seed for 3 - 6 seconds in boiling water may speed up the germination process[11]. The seed is best sown as soon as it is ripe in a cold frame. Some might germinate in the following spring, though most will take another year. Another possibility is to harvest the seed 'green' (when the embryo has fully formed but before the seedcoat has hardened). The seedlings can be potted up into individual pots when they are large enough to handle. Grow on in pots until large enough, then plant out in early summer. When stored dry, the seed can remain viable for several years[1]. Cuttings of mature wood, 5 - 10cm with a heel, September/October in a cold frame. Plant out in the following autumn[1, 78]. Layering in September/October. Takes 12 months[78].

nwatta Succeeds in hot dry soils and in poor soils. Succeeds in most soils so long as they are well drained[186], preferring a neutral or slightly alkaline soil. Does well in chalky soils[1]. Grows well in heavy clay soils. Tolerates a pH range from 4 to 8[186]. Succeeds in light woodland but dislikes heavy shade[186]. Established plants are very tolerant of drought[186]. Although the fully dormant plant is cold-tolerant throughout Britain, the young growth in spring can be damaged by late frosts. A very polymorphic species, there is a huge range of cultivars of widely diverse habits[11, 81]. At least some forms tolerate maritime exposure[186], there is a thriving colony in an exposed position at Land's End in Cornwall[81]. Seed takes 2 - 3 years to ripen on the plant[11]. Plants are usually very slow growing, often only a few centimetres a year[186]. Resists honey fungus[88]. Plants are sometimes attacked by a rust, this fungus has an aecial stage on hawthorn (*Crataegus* spp.)[1]. Dioecious. Male and female plants must be grown if seed is required. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is flat with shallow roots spreading near the soil surface [2-1].

5.2.239 Polygonum bistortoides

American Bistort

4 tin 8 cyuc 3 kcaok 2 tcan 1 dwat 0.5 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Polygonum bistortoides is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been made for this species, there have been reports that some members of this genus can cause photosensitivity in susceptible people. Many species also contain oxalic acid (the distinctive lemony flavour of sorrel) - whilst not toxic this substance can bind up other minerals making them unavailable to the body and leading to mineral deficiency. Having said that, a number of common foods such as sorrel and rhubarb contain oxalic acid and the leaves of most members of this genus are nutritious and beneficial to eat in moderate quantities. Cooking the leaves will reduce their content of oxalic acid. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Edible Parts: Leaves Root SeedEdible Uses: Leaves - raw or cooked. A pleasant acid flavour, they are used as a potherb[183]. Root - raw or cooked[106]. Starchy and rather pleasant[85], the root can be baked or added to soups, stews etc[105, 161, 183, 257]. It was often dried before being used[207]. The raw root is slightly astringent, it becomes sweeter when boiled but is best when baked[212]. Seed - raw or cooked. It is rather small and fiddly to utilize.

dwatta Astringent PouliticeThe root is astringent. A poultice has been used in treating sores and boils[257].

nrakta Western N. America - Canada to California. **ksacta Moist** or wet meadows and swamps, seldom below 2500 metres[43, 85].

propta Seed - sow spring in a cold frame. Germination is usually free and easy. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer if they have reached sufficient size. If not, overwinter them in a cold frame and plant them out the following spring after the last expected frosts. Division in spring or autumn. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Succeeds in an ordinary garden soil[1] but prefers a moisture retentive not too fertile soil in sun or part shade[200]. Repays generous treatment[1]. Plants are growing well at Kew in a moist position by water in the rock gar-

their permanent positions in spring once they are growing vigorously and are large enough. Division in spring. Very easy, the plants divide successfully at any time in the growing season and the divisions can be planted straight out into their permanent positions if required.

nwatta An easily grown plant[203], it prefers a sunny position in a light well-drained soil[1]. Succeeds in heavy soils and in light shade[203]. The bulbs should be planted fairly deeply[1]. Closely related to *A. senescens*, differing mainly in having keeled leaves[203]. It has the same uses as that species[K]. Grows well with most plants, especially roses, carrots, beet and chamomile, but it inhibits the growth of legumes[18, 20, 54]. This plant is a bad companion for alfalfa, each species negatively affecting the other[201]. Members of this genus are rarely if ever troubled by browsing deer[233].

5.2.236 Brassica oleracea gongyloides

Kohl Rabi

4 tlin 8 cyuc 3 kcaak 0 tcan 1 dwat 0.5 m hkuc hmimhtut cyutli hgattcup hwicli hrasjlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli fyfjre7t hjonli

drutta *Brassica oleracea gongyloides* is a BIENNIAL growing to 0.5 m (1ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. The plant can tolerate maritime exposure.

kcakta Edible Parts: Leaves StemEdible Uses: Leaves - cooked[142]. Used as a vegetable, though the quality is not as good as cabbage. The young leaves can also be added to salads, though some people find them difficult to digest. A nutritional analysis is available[218]. Stem - raw or cooked. The plant produces a swollen stem just above ground level, and this is often used as a root vegetable[K]. It has a mild cabbage flavour, when finely grated it makes a good addition to mixed salads and, when cooked, is an excellent vegetable[K]. It is best eaten whilst fairly small and tender, between golf ball and tennis ball size. It becomes coarse with age[33, 116, 142]. A nutritional analysis is available[218].

dwatta Digestive TonicThe leaf is digestive and tonic[218].

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

propta Seed - sow April to August in situ. Earlier sowings can be made under cloches.

nwatta Succeeds in full sun in a well-drained fertile preferably alkaline soil[200]. Succeeds in any reasonable soil, though it is best not grown in an acid soil[16, 33]. Tolerates a pH in the range 4.5 to 7.5. Prefers some shade and plenty of moisture in the growing season[20, 37]. Established plants are drought tolerant but the best stems are formed when the plant does not go short of moisture[20, 37]. Succeeds in maritime gardens[200]. Very winter hardy, kohl rabi withstands severe frosts and so can be left in the ground all winter in most areas and be harvested as required. The young growing plant, however, is sensitive to low temperatures and a week at 10°C will cause the plants to bolt[200]. It grows best at a temperature between 18 and 25°C[200]. Kohl rabi is often cultivated for its edible swollen stem which can be available almost all year round from successional sowings. There are several named varieties and stem colour can range from white to green and purple[200]. Green forms are faster to mature and so more suitable for early sowings, the purple forms are hardier and later to mature, they are used mainly for winter crops[200]. Very fast growing, the stems of some cultivars can be harvested 6 - 8 weeks after sowing[33]. The plant is more tolerant of drought and high temperatures than turnips, which it resembles in flavour, and so it is often grown as a substitute for that species[200]. Grows well with onions, beet and aromatic herbs which seem to reduce insect predations[18, 20, 201]. Plants also grow well with cucum-

bers, the roots of each species occupying different levels in the soil[201]. Grows badly with strawberries, runner beans and tomatoes[18, 20, 201].

5.2.237 Chenopodium capitatum

Strawberry Blite, Blite goosefoot

4 tlin 8 cyuc 3 kcaak 0 tcan 1 dwat 0.6 m hkuc htut cyutli toup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Chenopodium capitatum* is an ANNUAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista The leaves and seeds of all members of this genus are more or less edible. However, many of the species in this genus contain saponins, though usually in quantities too small to do any harm. Although toxic, saponins are poorly absorbed by the body and most pass straight through without any problem. They are also broken down to a large extent in the cooking process. Saponins are found in many foods, such as some beans. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K]. The plants also contain some oxalic acid, which in large quantities can lock up some of the nutrients in the food. However, even considering this, they are very nutritious vegetables in reasonable quantities. Cooking the plants will reduce their content of oxalic acid. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Edible Parts: Fruit Leaves SeedEdible Uses: ColouringLeaves - raw or cooked[27, 106]. Used like spinach[2], they are a good source of vitamins C and A[257]. The young leaves are best[85, 172, 183]. Poor quality[74]. The raw leaves have been used in salad mixtures[257], but should only be eaten in small quantities, see the notes above on toxicity. Fruit - raw or cooked[2, 27, 172]. An insipid but sweet flavour[85], they can be added to salads[183]. The fruit is about 12mm in diameter[200]. A red food colouring can be obtained from the fruit[74, 99, 172, 183]. Seed - cooked. It can be ground into a meal and mixed with cereal flours in making bread etc[161, 172]. The seed is small and fiddly, it should be soaked in water overnight and thoroughly rinsed before it is used in order to remove any saponins.

tcanta DyeGold/green dyes can be obtained from the whole plant[168]. A red dye is obtained from the fruit, it is used in cosmetics and as a paint[46, 257].

dwatta Antiphlogistic PectoralThe plant has been used as a lotion for treating black eyes and head bruises[257]. The juice of the seeds and an infusion of the plant has been used to treat lung congestion[257].

nrakta Europe. A rare casual in Britain[17]. ksacta Rub-bish tips etc in Britain[17].

propta Seed - sow spring in situ. Most of the seed usually germinates within a few days of sowing.

nwatta An easily grown plant, succeeding in most soils but disliking shade[1, 200]. It prefers a moderately fertile soil[200]. A very ornamental plant[74], strawberry blite has at times been cultivated for its edible leaves[61].

5.2.238 Juniperus communis nana

Juniper

4 tlin 10 cyuc 3 kcaak 4 tcan 3 dwat 0.5 m hkuc hmimhtut cyutli hgatkyuctup hwicli hyhsrasjlutnyikfrip hpa7tli frusflatprikliwsslp hpa7tmwatli nyanhjen hjonli

drutta *Juniperus communis nana* is an evergreen Shrub growing to 0.5 m (1ft 8in) by 1 m (3ft 3in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 2 and is not frost tender. It is in leaf all year, in flower from May to June, and the seeds ripen in October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and

5.2.179 Amelanchier sanguinea

Roundleaf Serviceberry, Gaspé serviceberry

4 tlin 8 cyuc 3 kcaak 0 tcan 0 dwat 3 m hkuc hmimhtut cyutli kyuctup hwicli hrasjlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli fyfjre7t hjonli

drutta *Amelanchier sanguinea* is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in April. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: FruitEdible Uses: Edible fruit - raw or cooked[101, 105]. A sweet flavour[177]. The fruit is produced in small clusters and is up to 11mm in diameter[229]. The fruit is rich in iron and copper[226].

nrakta Eastern N. America - Maine to New Jersey, west to Minnesota and Iowa. ksacta Open woods, rocky slopes and river banks on neutral to slightly calcareous soils[43].

propta Seed - it is best harvested 'green', when the seed is fully formed but before the seed coat has hardened, and then sown immediately in pots outdoors or in a cold frame. If stored seed is obtained early enough in the autumn, it can be given 4 weeks warm stratification before being left out in the winter and it should then germinate in the spring. Otherwise seed can be very slow to germinate, perhaps taking 18 months or more. When large enough to handle, prick the seedlings out into individual pots and grow them on in a sheltered outdoor position, planting them out once they are 20cm or more tall. If there is sufficient seed it is best to sow it thinly in an outdoor seedbed[78, 80]. Grow the seedlings on for two years in the seedbed before planting them out into their permanent positions during the winter. Layering in spring - takes 18 months[78]. Division of suckers in late winter. The suckers need to have been growing for 2 years before you dig them up, otherwise they will not have formed roots. They can be planted out straight into their permanent positions if required.

nwatta Prefers a rich loamy soil in a sunny position or semi-shade[1, 200], but thrives in any soil that is not water-logged[11]. Grows well in heavy clay soils. Tolerates dry soils[200]. All members of this genus have edible fruits and, whilst this is dry and uninteresting in some species, in many others it is sweet and juicy. Many of the species have potential for use in the garden as edible ornamentals. The main draw-back to this genus is that birds adore the fruit and will often completely strip a tree before it is fully ripe[K]. Plants produce suckers and form thickets[200]. Hybridizes with *A. stolonifera*, *A. laevis* and *A. bartramiana*. Grafting onto seedlings of *A. lamarkii* or *Sorbus aucuparia* is sometimes practised in order to avoid the potential problem of hybridizing[1].

5.2.180 Sambucus racemosa kamschatcica

Red Elder

4 tlin 8 cyuc 3 kcaak 2 tcan 2 dwat 3 m hkuc hmimhtut cyutli toup hwicli hrasjlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Sambucus racemosa kamschatcica* is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from April to May, and the seeds ripen from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

pcista Although no specific mention has been seen for this species, the leaves and stems of some, if not all, members of this genus are poisonous[9, 76]. The fruit of this species has been known to cause stomach upsets to some people. Any toxin the fruit might contain is liable to be of very low

toxicity and is destroyed when the fruit is cooked[65, 76]. The seed is said to be poisonous[21].

kcakta Edible Parts: Flowers FruitEdible Uses: Fruit - raw or cooked[13]. The tastiest fruit in this genus[7]. Rich in vitamin C, the seed can be removed and the fruit used in jellies, preserves etc[183]. The fruit is about 5mm in diameter and is borne in large clusters, making it easy to harvest[200]. Some caution is advised, see notes above on toxicity. Flowers - raw or cooked.

tcanta Repellent Straw WoodThe leaves are used to repel insects[6]. Wood - commonly used in the manufacture of domestic items. It can be hollowed out to make flutes, pipes, straws etc[7, 99].

dwatta Anodyne Carminative Depurative Diaphoretic Diuretic Laxative Purgative Resolvent Vitamin C Vulnerary-The leaves, stems and the roots are anodyne, carminative and vulnerary[13, 147]. A decoction is used in the treatment traumatic injuries, fractures, rheumatoid arthralgia, gas pains, acute and chronic nephritis[147]. The fruit is depurative and laxative[7, 9]. The leaves are diuretic, resolvent and sudorific[7]. They are used externally to soothe abscesses and boils[7]. The root, and the oil from the seed, are purgative[7, 9].

nrakta Europe to W. Asia. Occasionally naturalized in N. Britain[17]. ksacta Woods, mainly in mountains[50].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame, when it should germinate in early spring. Stored seed can be sown in the spring in a cold frame but will probably germinate better if it is given 2 months warm followed by 2 months cold stratification first[78, 98, 113]. Prick out the seedlings into individual pots when they are large enough to handle. If good growth is made, the young plants can be placed in their permanent positions during the early summer. Otherwise, either put them in a sheltered nursery bed, or keep them in their pots in a sheltered position and plant them out in spring of the following year. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame[78]. Cuttings of mature wood of the current season's growth, 15 - 20cm with a heel, late autumn in a frame or a sheltered outdoor bed[78]. Division of suckers in the dormant season.

nwatta Tolerates most soils, including chalk[200], but prefers a moist loamy soil[11, 200]. Grows well in heavy clay soils. Tolerates some shade but is best in a sunny position. Prefers cool moist conditions. Tolerates atmospheric pollution and coastal situations. Hardy to about -25°C[184]. Plants self-sown in N. Britain but they rarely fruit well in S. Britain[3, 182]. There are some named varieties developed for their ornamental value[182]. The flowers have a sweet smell, free from the fishy undertones found in some other members of the genus[245]. This subspecies has larger fruits and seeds than the type[200]. Plants in this genus are notably resistant to honey fungus[200].

5.2.181 Helianthus giganteus

Giant Sunflower

4 tlin 8 cyuc 3 kcaak 0 tcan 0 dwat 3.6 m hkuc htut cyutli toup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Helianthus giganteus* is a PERENNIAL growing to 3.6 m (11ft 10in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from September to October, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Root SeedEdible Uses: Tubers - cooked[95]. A similar taste to Jerusalem artichokes but less productive. The var. 'subtuberosus' is used[1, 177]. Seed - raw or cooked. It can be dried and ground into a powder, then mixed with cornmeal and used for making bread[2, 14, 46, 61, 183]. The seed is very small and fiddly to use[K].

nrakta N. America - Maine and Ontario to Saskatchewan, Florida, Louisiana and Colorado. ksacta Damp or rich thickets, swampy woods and clearings[43].

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

dividual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring or autumn. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring. Basal cuttings in spring. Harvest the shoots when they are about 10 - 15cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Succeeds in most soils in a sunny position[1]. Requires a rich soil[1]. Dislikes shade[1]. Likes moist soils, doing well by a stream[200]. The young growth is extremely attractive to slugs, plants can be totally destroyed by them[K]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Plants have a running root system and can be invasive[1]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

5.2.182 Prunus spinosa

Sloe - Blackthorn
4 tin 8 cyuc 3 kcaak 4 tcan 2 dwat 3 m hkuc
hmimhtut cyuti tcup hwicli hrasljutnyik hpa7tli flatprikliwslisslp hpa7tmwatli xre7t hjonli

drutta Prunus spinosa is a deciduous Shrub growing to 3 m (9ft 10in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from March to April, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death. Avoid excessive intake and use recommended doses.

kcakta Edible Parts: Flowers Fruit SeedEdible Uses: TeaFruit - raw or cooked[2, 5, 7, 11, 12, 13, 34]. Exceedingly astringent, it is normally cooked but once the fruit has been frosted it loses some of its astringency and some people find they can enjoy it raw[183, K]. The fruit is more usually used in jellies, syrups, conserves etc and as a flavouring for sloe gin and other liqueurs[183]. Some fruits that we ate in December were fairly pleasant raw[K]. In France the unripe fruit is pickled like an olive[183]. The fruit is about 15mm in diameter and contains one large seed[200]. Seed - raw or cooked. Do not eat the seed if it is too bitter - see the notes above on toxicity. The leaves are used as a tea substitute[7, 183]. The dried fruits can be added to herbal teas[183]. The flowers are edible and can be crystallised or sugared[183].

tcanta Cosmetic Dye Hedge Hedge Ink Pioneer Tannin WoodThe bark is a good source of tannin[7]. It is used to make an ink[66]. The juice of unripe fruits is used as a laundry mark[66], it is almost indelible[115]. The pulped ripe fruit is used cosmetically in making astringent face-masks[7]. A green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168]. The bark, boiled in an alkali, produces a yellow dye[66]. The sloe is very resistant to maritime exposure and also suckers

freely. It can be used as a hedge in exposed maritime positions. The hedge is stock-proof if it is well maintained[1, 29], though it is rather bare in the winter and, unless the hedge is rather wide, it is not a very good shelter at this time[K]. Because of its suckering habit, the plant is a natural pioneer species, invading cultivated fields and creating conditions conducive to the regeneration of woodland. Wood - very hard. Used for turnery, the teeth of rakes etc[1, 13, 46, 66]. Suitable branches are used for making walking sticks and are highly valued for this purpose because of their twisted and interesting shapes[7].

dwatta Antidiarrhoeal Antiflatulent Antispasmodic Aperient Astringent Depurative Diaphoretic Diuretic Febrifuge Laxative StomachicThe flowers, bark, leaves and fruits are aperient, astringent, depurative, diaphoretic, diuretic, febrifuge, laxative and stomachic[7, 9, 21]. An infusion of the flowers is used in the treatment of diarrhoea (especially for children), bladder and kidney disorders, stomach weakness etc[9]. Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Prunus spinosa Sloe - Blackthorn for inflammation of mouth and pharynx (see [302] for critics of commission E).

nrakta Europe, including Britain, from Scandanavia south and east to the Mediterranean, Siberia and Iran. ksacta Hedgerows and woods, usually in sunny positions, on all soils except acid peats[9, 17].

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200]. Softwood cuttings from strongly growing plants in spring to early summer in a frame. Layering in spring. Division of suckers during the dormant season. They can be planted out direct into their permanent positions.

nwatta Agroforestry Services: Living fence Agroforestry Services: Windbreak Industrial Crop: Oil Management: Standard Regional CropLandscape Uses:Specimen. Requires a well-drained moisture retentive soil[11]. Succeeds in all soils except very acid peats[186]. Succeeds in light shade but fruits better in a sunny position[11, 200]. Thrives in a loamy soil, doing well on limestone[11]. Prefers some chalk in the soil but apt to become chlorotic if too much is present[1]. Thrives on chalk according to another report[182]. Plants are very resistant to maritime exposure[186]. An important food plant for the caterpillars of several species of butterfly[30], especially the larvae of the brown and black hairstreak butterflies[186]. A good bee plant. Plants are shallow-rooted and of a suckering habit, they can form dense impenetrable thickets which are ideal for nesting birds, especially nightingales[186]. Flowers are often damaged by late frosts[186]. Plants regenerate quickly after cutting or after fast moving forest fires, producing suckers from below ground level[186]. This species is notably resistant to honey fungus[88, 200]. Special Features: All or parts of this plant are poisonous, Blooms are very showy. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is flat with shallow roots spreading near the soil surface. The root pattern is suckering with new plants from runners away from the plant [2-1].

5.2.183 Prunus alleghaniensis

Allegheny Plum, Davis' plum
4 tin 8 cyuc 3 kcaak 2 tcan 1 dwat 3.5 m hkuc
hmimhtut cyuti tcup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

to another report[200]. A polymorphic species[17]. A good butterfly plant[24]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fleshy. Thick or swollen - fibrous or tap root [2-1].

5.2.233 Hydrophyllum capitatum

Cat's Breeches, Ballhead waterleaf, Alpine waterleaf, Thompson's waterleaf
4 tin 8 cyuc 3 kcaak 0 tcan 0 dwat 0.5 m hkuc
hmim cyuti tcup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Hydrophyllum capitatum is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: Leaves RootEdible Uses: Tender young shoots - cooked as a potherb[207, 212]. Root - cooked[207]. Large and fleshy[212].

nrakta Western N. America - Alberta to British Columbia, south to Oregon and Colorado. ksacta Rich moist soils, most often in the shade, from valleys to around 2,700 metres[212].

propta Seed - best sown as soon as it is ripe in a cold frame. The seed usually germinates in early spring. Sow stored seed as early in the year as possible. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring or autumn[200]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Requires a moist humus-rich soil in semi-shade[200]. Grows well in an open woodland garden[200]. The leaves are shaped in such a way that they collect rain-water in a cavity[212]. Slugs are particularly fond of this plant and will soon destroy it if given a chance[K].

5.2.234 Aegopodium podagraria

Ground Elder, Bishop's goutweed, Goutweed, Ground Elder, Bishop's Weed
4 tin 9 cyuc 3 kcaak 1 tcan 2 dwat 0.6 m hkuc
pcimhmimhtut cyuti tcup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli fyixre7t hjonli

drutta Aegopodium podagraria is a PERENNIAL growing to 0.6 m (2ft) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked[2, 4, 5, 12, 54, 100]. An unusual tangy flavour[183], the majority of people we give it to do not like it[K] although some reports say that it makes a delicious vegetable[244]. The leaves are best harvested before the plant comes into flower, they can be used in salads, soups, or cooked as a vegetable[9].

tcanta This species makes a good ground-cover for semi-wild situations[200]. Make sure that it has plenty of room since it can be very invasive and is considered to be a weed in many gardens[208].

dwatta Antirheumatic Diuretic Sedative Vulnerary-Ground Elder has a long history of medicinal use and was cultivated as a food crop and medicinal herb in the Middle Ages. The plant was used mainly as a food that could counteract gout, one of the effects of the rich foods eaten by monks, bishops etc at this time. The plant is little used in modern

herbalism. All parts of the plant are antirheumatic, diuretic, sedative and vulnerary[9, 13, 53, 54, 61]. An infusion is used in the treatment of rheumatism, arthritis and disorders of the bladder and intestines[9]. Externally, it is used as a poultice on burns, stings, wounds, painful joints etc[9, 268]. The plant is harvested when it is in flower in late spring to mid-summer and can be used fresh or be dried for later use[9, 238]. A homeopathic remedy is made from the flowering plant[9]. It is used in the treatment of arthritis and rheumatism[9].

nrakta Most of Europe, including Britain, to western Asia and Siberia. ksacta Hedgerows and cultivated land[17]. A common garden weed[17].

propta Seed - sow spring in a cold frame. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring. Very easy, divisions can be carried out at almost any time of the year and the divisions can be planted out straight into their permanent positions.

nwatta Landscape Uses:Border, Container, Foundation, Ground cover, Woodland garden. Prefers damp shady conditions[12, 13, 200] but succeeds in most soils[200]. Prefers a well-drained soil, succeeding in sun or shade[238]. Plants are hardy to at least -15°C[200]. This species was cultivated in the Middle Ages as a medicinal and food plant[5, 17, 177, 268]. A very invasive plant, spreading freely at the roots[4, 53, 208], though it seldom sets seed in Britain[208]. Once established it can be very difficult to eradicate because any small piece of root left in the ground can regrow[K]. If introducing this plant to your garden, it might be best to restrict the roots by growing the plant in a bottomless container buried in the soil[238]. There is a variegated form of this species that is less invasive and is sometimes grown in the ornamental garden[208]. Plants seem to be immune to the predations of rabbits[233]. Special Features: Attractive foliage, Not North American native, Invasive, Naturalizing, Wetlands plant. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [2-1].

5.2.235 Allium suaveolens

4 tin 8 cyuc 3 kcaak 0 tcan 2 dwat 0.5 m hkuc
hmimhtut cyuti tcup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Allium suaveolens is an evergreen Bulb growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no individual reports regarding this species have been seen, there have been cases of poisoning caused by the consumption, in large quantities and by some mammals, of certain members of this genus. Dogs seem to be particularly susceptible[76].

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Bulb - raw or cooked. Leaves - raw or cooked. Flowers - raw. Used as a garnish on salads.

tcanta RepellentThe juice of the plant is used as a moth repellent. The whole plant is said to repel insects and moles[20].

dwatta Although no specific mention of medicinal uses has been seen for this species, members of this genus are in general very healthy additions to the diet. They contain sulphur compounds (which give them their onion flavour) and when added to the diet on a regular basis they help reduce blood cholesterol levels, act as a tonic to the digestive system and also tonify the circulatory system[K].

nrakta S. and C. Europe. ksacta Damp meadows and moors[203].

propta Seed - sow spring in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle - if you want to produce clumps more quickly then put three plants in each pot. Grow them on in the greenhouse for at least their first winter and plant them out into

tap root. Put the plants into their permanent positions as soon as possible, preferably in their first summer, and give them some protection from the cold for at least the first winter[78, K]. Seed can also be sown in situ so long as protection is given from mice etc and the seed is given some protection from cold[200] (a plastic bottle with the top and bottom removed and a wire mesh top fitted to keep the mice out is ideal)

nwatta Prefers a deep moisture-retentive loam in a sunny sheltered position, requiring a good summer for best development[1, 63, 137, 200]. Slow growing[200]. Plants are strongly tap-rooted and should be planted in their permanent positions as soon as possible[1, 137]. Sowing in situ would be the best method so long as the seed could be protected from mice[1, 200]. Trees are late coming into leaf (usually late May to June) and lose their leaves early in the autumn (usually in October)[137]. During this time they cast a heavy shade. These factors combine to make the trees eminently suitable for a mixed woodland planting with shrubs and other trees beneath them[137]. Plants in this genus are notably resistant to honey fungus[200]. Most species in this genus have quite a wide range of distribution and, in order to find trees more suited to this country, seed from the most appropriate provenances should be sought[137]. Most trees growing in Britain at present tend to only produce good seed after hot summers[137]. Trees are self-fertile but larger crops of better quality seeds are produced if cross-pollination takes place[229].

5.2.231 *Vitis cinerea floridana*

Currant Grape

4 tlin 8 cyuc 3 kcaak 0 tcan 0 dwat m hkuc
hmimhtut cyutli kyucctup hwicli hrasjlutnyik hpa7tli flatprikliws
hpa7tmwatli xre7t hjonli

drutta *Vitis cinerea floridana* is a deciduous Climber. See above for USDA hardness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to July, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Fruit Leaves SapEdible Uses: Fruit - raw or dried for winter use[183]. It can also be used in pies, jellies etc. The fruit is about 4 - 6mm in diameter[200] and is borne in bunches. Young leaves are wrapped around other foods and then baked, they impart a pleasant flavour. Young tendrils - raw or cooked. The sap is made into a tasty beverage.

tcanta Dye RootstockA yellow dye is obtained from the fresh or dried leaves[168]. Used as a rootstock.

nrakta South-eastern N. America - S.E. Virginia to Florida. ksacta Not known

propta Seed - best sown in a cold frame as soon as it is ripe[K]. Six weeks cold stratification improves the germination rate, and so stored seed is best sown in a cold frame as soon as it is obtained. Germination should take place in the first spring, but sometimes takes another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant out in early summer. Cuttings of mature wood of the current seasons growth, December/January in a frame. These cuttings can be of wood 15 - 30cm long or they can be of short sections of the stem about 5cm long with just one bud at the top of the section. In this case a thin, narrow strip of the bark about 3cm long is removed from the bottom half of the side of the stem. This will encourage callusing and the formation of roots. Due to the size of these cuttings they need to be kept in a more protected environment than the longer cuttings. Layering.

nwatta Prefers a deep rich moist well-drained moderately fertile loam[1, 200]. Grows best in a calcareous soil[200]. Succeeds in sun or partial shade though a warm sunny position is required for the fruit to ripen[200]. The young growth in spring can be damaged by late frosts. Plants climb by means of tendrils[182]. Any pruning should be carried out in winter when the plants are dormant otherwise they bleed profusely[182, 200]. Used in breeding pro-

grammes to develop resistant varieties for Florida and other hot areas[183]. There are some named varieties[183]. Plants in this genus are notably susceptible to honey fungus[200].

5.2.232 *Arctium minus*

Lesser Burdock

4 tlin 8 cyuc 3 kcaak 4 tcan 5 dwat m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliws
hpa7tmwatli fyfxfre7t hjonli

drutta *Arctium minus* is a BIENNIAL growing to 1 m (3ft 3in). See above for USDA hardness. It is hardy to UK zone 5 and is not frost tender. It is in flower from July to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no reports of toxicity have been seen for this plant, some caution is advised due to the following report for the closely related *A. lappa*[K]. Care should be taken if harvesting the seed in any quantity since tiny hairs from the seeds can be inhaled and these are toxic[205].

kcakta Edible Parts: Leaves Root Seed StemEdible Uses: CoffeeRoot - raw or cooked[62, 85]. The best roots are obtained from young plants[85]. Usually peeled and sliced[183]. The roasted root is a coffee substitute[183]. Young leaves and leaf stems - raw or cooked[85]. Used as a potherb[183]. Mucilaginous. It is best to remove the rind from the stem[85]. Young flowering stem - peeled and eaten raw or cooked like asparagus[177, 183]. Seed sprouts[55]. No further details.

tcanta PaperA fibre is obtained from the inner bark and is used to make paper. It is about 0.9mm long[189]. The stems are harvested in late summer, the leaves are removed and the stems steamed in order to strip off the fibre. The fibres are then cooked for two hours in soda ash before being put in a ball mill for 2 hours[189]. The resulting paper is a light tan/ brown colour[189].

dwatta Alterative Antibacterial Antifungal Aperient Blood purifier Carminative Cholagogue Diaphoretic Diuretic Eczema HypoglycaemicBurdock is one of the foremost detoxifying herbs in both Chinese and Western herbal medicine[254]. *Arctium lappa* is the main species used, though this species has similar properties[254]. The dried root of one year old plants is the official herb, but the leaves and fruits can also be used[4]. It is used to treat conditions caused by an 'overload' of toxins, such as throat and other infections, boils, rashes and other skin problems[254]. The root is thought to be particularly good at helping to eliminate heavy metals from the body[254]. The plant is antibacterial, antifungal and carminative[9, 21, 147, 165, 176]. It has soothing, mucilaginous properties and is said to be one of the most certain cures for many types of skin diseases, burns, bruises etc[4, 244]. It is used in the treatment of herpes, eczema, acne, impetigo, ringworm, boils, bites etc[244]. The plant can be taken internally as an infusion, or used externally as a wash[244]. Use with caution[165]. One-year old roots are alterative, aperient, blood purifier, cholagogue, depurative, diaphoretic, diuretic and stomachic[218, 222]. The seed is alterative, antibacterial, antifungal, antiphlogistic, depurative, diaphoretic, diuretic and hypoglycaemic[176, 218]. It is used in the treatment of colds with sore throat and cough, measles, pharyngitis, acute tonsillitis and abscesses[176]. The crushed seed is poulticed onto bruises[222]. The seed is harvested in the summer and dried for later use[254]. The seed contains arctiin, this excites the central nervous system producing convulsions an increase in respiration and later paralysis. It also lowers the blood pressure by dilating the blood vessels[176]. The leaves are poulticed onto burns, ulcers and sores[222].

nrakta Most of Europe, including Britain, south and east to N. Africa and the Caucasus. ksacta Waste ground, edges of woods, roadsides etc[5, 13].

propta Seed - best sown in situ in autumn.

nwatta Succeeds on most soils, preferably moist[200]. Prefers a sunny position. Prefers partial shade according

drutta *Prunus alleghaniensis* is a deciduous Tree growing to 3.5 m (11ft 6in) at a fast rate. See above for USDA hardness. It is hardy to UK zone 5. It is in flower in April, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: Fruit SeedEdible Uses: Fruit - raw or cooked[11, 82, 105, 183]. The thick juicy flesh is pleasantly acid[183, 229]. The fruit can also be made into jams, preserves etc[82, 183]. The fruit has a tough skin, it can be up to 2cm in diameter and contains one large seed[82, 229]. Seed - raw or cooked. Do not eat the seed if it is too bitter - see the notes above on toxicity.

tcanta Dye WoodA green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168]. Wood - hard, heavy, close grained[82]. Trees are too small for the wood to be commercially valuable[229].

dwatta Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta Eastern N. America - Connecticut to Pennsylvania, south to Tennessee. ksacta Thickets and woodland edges[43, in low moist soils and on dry ridges, especially limestone bluffs[82]. It forms large thickets in open sites, or grows as individual trees in woodland shade[229].

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200]. Softwood cuttings from strongly growing plants in spring to early summer in a frame[200]. Layering in spring.

nwatta Thrives in a well-drained moisture-retentive loamy soil, growing well on limestone[11, 200]. Prefers some lime in the soil but is likely to become chlorotic if too much lime is present[1]. Succeeds in sun or partial shade though it fruits better in a sunny position[11, 200]. A fast-growing but short-lived tree in the wild[229]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. This species is closely related to *P. americana*[200]. Plants in this genus are notably susceptible to honey fungus[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A sprouting standard sending up shoots from the base [1-2].

5.2.184 *Polygonum japonicum*

Japanese Knotweed, Mexican Bamboo, Japanese Knotweed
4 tlin 10 cyuc 3 kcaak 0 tcan 3 dwat 3 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliws
hpa7tmwatli nyanhjen hjonli

drutta *Polygonum japonicum* is a PERENNIAL growing to 3 m (9ft) by 5 m (16ft) at a fast rate. See above for USDA hardness. It is hardy to UK zone 5. It is in flower from July to October, and the seeds ripen from August to October. The

species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). . The plant is not self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been made for this species, there have been reports that some members of this genus can cause photosensitivity in susceptible people. Many species also contain oxalic acid (the distinctive lemony flavour of sorrel) - whilst not toxic this substance can bind up other minerals making them unavailable to the body and leading to mineral deficiency. Having said that, a number of common foods such as sorrel and rhubarb contain oxalic acid and the leaves of most members of this genus are nutritious and beneficial to eat in moderate quantities. Cooking the leaves will reduce their content of oxalic acid. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Edible Parts: Leaves Root Seed StemEdible Uses: Young shoots in spring - cooked. They can be used as an asparagus substitute[55, 62, 116, 1599, 179, 183]. They have an acid flavour and can also be used as a rhubarb substitute in pies, fruit soups, jams etc[183]. Older stems and shoot tips - cooked[62, 159]. They taste like a mild version of rhubarb[K]. Seed - raw or cooked. It is rather small and fiddly to utilize. The seed can also be ground into a powder and used as a flavouring and thickener in soups etc, or can be mixed with cereals when making bread, cakes etc. The root is sometimes eaten[183].

tcanta Biomass DyeA yellow dye is obtained from the root[46, 61]. The plant is potentially a good source of biomass. Plants can be grown to form a ground cover that will exclude all other growth[208]. It is best to use the sub-species compactum since this is less invasive[208].

dwatta Antiphlogistic Antitumor Depurative Diuretic Emollient Fibrifuge Stomachic Vulnerary Women's complaintsThe root is antiphlogistic, heclic, depurative, diuretic, emmenagogue, emollient, fibrifuge, stomachic and vulnerary[46, 61, 147, 178, 218]. It is also used in the treatment of women's complaints[147]. A decoction is used in the treatment of burn injuries, boils and abscesses, poisonous snakebites, acute hepatitis, appendicitis, traumatic injuries and menstrual irregularities[147]. The leaves can be crushed and applied externally as a poultice to abscesses, cuts etc, whilst the dried roots can be ground into a powder and applied externally[147]. Extracts of the plant have shown antitumour activity[218].

nrakta E. Asia - Japan. Commonly naturalized in S. England. ksacta Wet grassy places in lowland all over Japan[58].

propta Seed - sow spring in a cold frame. Seed - sow spring in a cold frame. Germination is usually free and easy. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer if they have reached sufficient size. If not, overwinter them in a cold frame and plant them out the following spring after the last expected frosts. Division in spring or autumn. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Landscape Uses:Container, Specimen, Woodland garden. A very easily grown plant, it succeeds in ordinary garden soil in sun or shade[1, 111], though it prefers a moist soil in partial shade[187]. Japanese knotweed is an extremely invasive plant capable of sending up new shoots at a considerable distance from the main clump and also of growing up through tarmac[200]. The sub-species cuspidatum is the form that is most likely to cause problems. It is considered to be a pest in many areas, where it is forming large clumps in the wild and out-competing native species. If grown in the garden it should be planted within a strong barrier to contain its roots. The sub-species compacta is only about 70cm tall and is far less invasive, but should still not be grown in small gardens[200]. A report on the Natural History Programme stated that Japanese knotweed is actually becoming a very valuable habitat for spiders, frogs, grass snakes and many other creatures. Its hollow stems allow a wide variety

of insects and other small creatures to overwinter and find hiding places, thus a greater abundance of food is provided for insectivores such as frogs, who are themselves eaten by grass snakes. In areas of north Wales where Japanese knotweed has run rife, it is now the primary habitat for grass snakes[215]. Plants seem to be immune to the predations of rabbits[233]. Often cultivated as a dye and a medicinal plant[46, 61]. Very closely related to *P. conspicuum*[58]. Dioecious, male and female plants must be grown if seed is required[58]. Special Features: Attractive foliage, Invasive, Wetlands plant.

5.2.185 Chaenomeles speciosa

Japanese Quince, Flowering quince
4 tlin 8 cyuc 3 kcaak 3 tcan 2 dwat 3 m hkuc
pcimhmimhtut cyutli tcup hwicli hrasljutnyikfrp hpa7tli flatprikliws hpa7tmwatli xre7t hjonli

drutta *Chaenomeles speciosa* is a deciduous Shrub growing to 3 m (9ft) by 5 m (16ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from February to June, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - cooked[3, 4, 177]. Very harsh and acid raw but fragrant when cooked[1, 11]. Used for jams, jellies etc and as a flavouring with cooked apples[183, K]. The fruit can be apple or pear-shaped and up to 6.5cm long x 6.5cm wide[200].

tcanta Hedge HedgePlants can be grown as a medium sized hedge[11, 29, 200]. Some cultivars, such as 'Jet Trail' are suitable for ground cover[182].

dwatta Analgesic Antiemetic Antiinflammatory Antispasmodic Astringent Cholera DigestiveThe fruit is analgesic, anti-inflammatory, antispasmodic, astringent and digestive[147, 218, 238]. A decoction is used internally in the treatment of nausea, joint pains, cholera and associated cramps[147, 218, 238].

nrakta E. Asia - China. An occasional garden escape in Britain[17]. ksacta Long cultivated, its natural habitat is now obscure.

propta Seed - best sown as soon as it is ripe in a sheltered position outdoors or in a cold frame[200]. Sow stored seed in February in a greenhouse[78]. Germination usually takes place within 6 weeks[78]. Prick out the seedlings into individual pots as soon as they are large enough to handle. If well grown, these seedling can be large enough to plant out in the summer, but give them some protection in their first winter. Otherwise plant them out in late spring of the following year[K]. Cuttings of half-ripe wood, July/August in a frame[11]. Easy[113]. Cuttings of mature wood of the current year's growth, November in a cold frame. Layering in late spring or in autumn. This is a sure and easy method, though it takes 12 months[78, 200].

nwatta Landscape Uses:Border, Espalier, Hedge, Massing, Woodland garden . Easily cultivated in any reasonably good soil[1, 11]. Prefers a deep moist well-drained loam[11]. Grows well in heavy clay soils. Tolerates full shade but requires a sunny position for best fruit production[3, 11, 200]. Becomes chlorotic on very alkaline soils[200]. Tolerates atmospheric pollution[200]. This species is hardy to about -25°C[200]. Plants fruit freely in Britain, but the fruit does not always ripen. They do best when grown against a south-facing wall[11]. A very ornamental plant[1], there are many named varieties developed for their ornamental value[182, 183]. Closely allied to *C. japonica*[11]. A good bee plant, flowering early in the year and providing pollen and nectar[108]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: Not North American native, Attractive flowers or blooms. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days"

experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

5.2.186 Reynoutria japonica

Japanese knotweed.

4 tlin 8 cyuc 3 kcaak 3 tcan 3 dwat 2 m hkuc
hmimhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikliws hpa7tmwatli hjonli

drutta *Reynoutria japonica* is a PERENNIAL growing to 2 m (6ft) by 2 m (6ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been made for this species, there have been reports that some members of this genus can cause photosensitivity in susceptible people. Many species also contain oxalic acid (the distinctive lemony flavour of sorrel) - whilst not toxic this substance can bind up other minerals making them unavailable to the body and leading to mineral deficiency. Having said that, a number of common foods such as sorrel and rhubarb contain oxalic acid and the leaves of most members of this genus are nutritious and beneficial to eat in moderate quantities. Cooking the leaves will reduce their content of oxalic acid. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Edible Parts: Leaves Root Seed Shoots StemEdible Uses: Edible Portion: Leaves, Shoots, Rhizomes, Roots. Young shoots in spring - cooked. They can be used as an asparagus substitute[55, 62, 116, 1599, 179, 183]. They have an acid flavour and can also be used as a rhubarb substitute in pies, fruit soups, jams etc[183]. Older stems and shoot tips - cooked[62, 159]. They taste like a mild version of rhubarb[K]. Seed - raw or cooked. It is rather small and fiddly to utilize. The seed can also be ground into a powder and used as a flavouring and thickener in soups etc, or can be mixed with cereals when making bread, cakes etc. The root is sometimes eaten[183].

tcanta Carbon Farming Solutions - Industrial Crop: fiber (Crops grown for non-food uses. Industrial crops provide resources in three main categories: materials, chemicals, and energy. Traditional materials include lumber and thatch, paper and cardboard, and textiles) [1-1].

dwatta Possibly may have similar properties to other knotweeds where the root can be antiphlogistic, bechic, depurative, diuretic, emmenagogue, emollient, febrifuge, stomachic and vulnerary[46, 61, 147, 178, 218]. It is also used in the treatment of women's complaints[147]. A decoction is used in the treatment of burn injuries, boils and abscesses, poisonous snakebites, acute hepatitis, appendicitis, traumatic injuries and menstrual irregularities[147]. The leaves can be crushed and applied externally as a poultice to abscesses, cuts etc, whilst the dried roots can be ground into a powder and applied externally[147]. Extracts of the plant have shown antitumour activity[218].

nrakta Origin: Asia. ksacta Cold to warm temperate. It grows in forests and humid areas. It grows in wetlands.

propta Plants can be grown from seeds.

nwatta Experimental Crop Industrial Crop: Fiber Management: HayClimate: cold to warm temperate. Humidity: humid. Carbon Farming Solutions - Cultivation: experimental. Management: hay (Describes the

herbal medicine, approve *Primula veris* for cough/bronchitis (see [302] for critics of commission E).

nrakta Europe, including Britain but absent from the extreme north, to temperate Asia. ksacta Grassy places, fields and woods with calcareous soils[7, 9, 13, 24].

propta Seed - best sown as soon as it is ripe in a cold frame[133]. Sow stored seed in early spring in a cold frame[1]. Germination is inhibited by temperatures above 20°C[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in autumn. This is best done every other year[200].

nwatta Prefers a medium to heavy moisture retentive humus rich loam in a cool position with light to medium shade[200]. Grows well in heavy clay soils and on chalk[187]. Prefers full sun and a well-drained alkaline soil if it is to survive well[187, 238]. Plants are hardy to about -20°C[187]. A very ornamental plant[1], it grows well in the spring meadow[24]. The flowers diffuse a sweet fragrance quite unlike all other flower scents. It has been likened by some to the breath of a cow (cuslippe is the Saxon word for this and thus the origin of the common name), by others to the sweet milky breath of a tiny child[245].

5.2.229 Quercus muehlenbergii

Yellow Chestnut Oak, Chinkapin oak

4 tlin 8 cyuc 3 kcaak 3 tcan 2 dwat m hkuc
hmimhtut cyutli tcup hwicli jlutnyik hpa7tli flatprikliws hpa7tmwatli hjonli

drutta *Quercus muehlenbergii* is a deciduous Tree growing to 20 m (65ft) by 10 m (32ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from May to June, and the seeds ripen in November. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: CoffeeSeed - cooked. It is up to 18mm long[277]. The seed contains very little bitter tannin, it is quite sweet and rather pleasant eating[183, 227]. Tastes nice when baked in an oven[183]. Any bitter seeds can be leached by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency Roasted seed is a coffee substitute.

tcanta Fuel Repellent Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. Wood - heavy, very hard, strong, close grained, durable. It weighs 53lb per cubic foot[277]. Not abundant enough to be used commercially, it is used for fencing, cooperage etc and makes an excellent fuel[82, 149, 229].

dwatta Antiemetic Astringent DysenteryAn infusion of the bark has been used in the treatment of vomiting[257]. Any galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta Eastern N. America - Vermont and Ontario to Minnesota, Nebraska, Alabama and Texas. ksacta Dry calcareous slopes and ridges, or on rich bottoms[43]. Well-drained uplands[227], favouring limestone soils and avoiding acid soils[229].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Landscape Uses:Pest tolerant, Aggressive surface roots possible, Specimen, Street tree. Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. Prefers warmer summers than are usually experienced in Britain, trees often grow poorly in this country and fail to properly ripen their wood resulting in frost damage overwinter[200]. Growth is fairly rapid for an oak[227], especially when the tree is young, though it slows down with age[229]. Seed production is cyclic, a year with high yields is followed by 2 - 3 years of light crops[229]. The tree flowers on new growth produced in spring, the seed ripening in its first year[200, 229]. Q. muehlenbergii brayi (Small.)Sarg. has somewhat larger seeds than the type, sometimes 3cm long[227]. Closely related to Q. prinus[11]. Trees are often confused with Q. prinus, Q. prinoides and Q. michauxii[200]. Trees respond well to coppicing[149]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200]. Special Features:North American native, Inconspicuous flowers or blooms. The plant is heat tolerant in zones 8 through 2. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. The root pattern is a heart root, dividing from the crown into several primary roots going down and out [1-2].

5.2.230 Carya glabra megacarpa

Coastal Pignut Hickory

4 tlin 8 cyuc 3 kcaak 0 tcan 0 dwat m hkuc
htut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikliws hpa7tmwatli fyif hjonli

drutta *Carya glabra megacarpa* is a deciduous Tree growing to 30 m (98ft 5in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in leaf from June to October; in flower from April to May. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: SeedEdible Uses: Seed - raw or cooked[105]. A sweet flavour. The seed ripens in late autumn and, when stored in its shell in a cool place, will keep for at least 6 months[K].

nrakta Eastern N. America - New York to Illinois and Florida. ksacta Dry woods and slopes[82].

propta Seed - requires a period of cold stratification. It is best sown in a cold frame as soon as it is ripe[78]. Stored seed should be kept moist (but not wet) prior to sowing and should be sown in a cold frame as soon as possible[78]. Where possible, sow 1 or 2 seeds only in each deep pot and thin to the best seedling. If you need to transplant the seedlings, then do this as soon as they are large enough to handle, once more using deep pots to accommodate the

well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kaakta Edible Parts: FruitEdible Uses: GumFruit - raw or cooked. Soft, juicy and pulpy[81, 85, 105], but with a thin flesh[82]. It can be dried and ground into a powder and then be baked[82, 227], or can be used as a seasoning in stews etc[161, 257]. The fruits were only used when other foods were in short supply[257]. The cones are about 5 - 8mm in diameter and ripen in their first year[200]. Inner bark - raw or cooked[257]. It was chewed in times of food shortage for the little nourishment it supplied[257]. The gum is chewed as a delicacy[161, 257]. No further details are given.

tcanta Beads Dye Fibre Fuel Gum Lighting Mordant Tindering Wood Thin strips of the fibrous bark are used for making sleeping mats etc[82, 227]. It has also been used as a lining in shoes to absorb moisture and to keep the feet warmer[257]. When rubbed fine, the bark can be used to make children's clothing[257]. The bark is employed as a tinder and is also made into a slow match or can be shredded, bound into bundles and used as a torch to give light in the house[216, 257]. The crushed bark was twisted into a rope, tied at intervals with yucca (Yucca species), and wrapped into a coil. The free end was set on fire and kept smouldering by blowing on it at intervals. Fire could be carried in this fashion for several hours[257]. The dried seeds have been used as beads or as the 'rattle' in rattles[216, 257]. A green dye is obtained from the bark and berries[229, 257]. A yellow dye is obtained from the whole plant[257]. Ashes from the whole plant have been used as a mordant to fix the colour of dyes[257]. Wood - moderately hard, somewhat heavy, slightly fragrant. When seasoned properly it is very durable and is used mainly for fencing and fuel[82, 227, 229]. As a fuel it burns steadily and evenly[257].

dwatta Antiphlogistic Birthing aid Diuretic Dysentery Febrifuge Laxative Odontalgic Pectoral Poultice StomachicOne-seed juniper was commonly employed medicinally by a number of native North American Indian tribes, who used it to treat a variety of complaints[257]. It is little, if at all, used in modern herbalism. The leaves are febrifuge, laxative and pectoral[216]. An infusion is used in the treatment of stomach complaints, constipation, coughs and colds[216]. An infusion was also used by pregnant women prior to childbirth in order to relax the muscles[257]. A poultice of the heated twigs can be bound over a bruise or sprain in order to reduce the swelling[257]. An infusion of the staminate cones has been used as a stomach tonic and in the treatment of dysentery[257]. The chewed bark has been applied externally to help heal spider bites[257]. It is also highly prized as a dressing on burns[257]. The fruits are strongly diuretic[257]. A gum from the plant has been used as a temporary filling in a decayed tooth[257].

nrakta South-western N. America - along the Rocky Mountains from Wyoming to Mexico. ksacta Dry rocky or sandy soils, 1000 - 2300 metres[229].

propta The seed requires a period of cold stratification. The seed has a hard seedcoat and can be very slow to germinate, requiring a cold period followed by a warm period and then another cold spell, each of 2 - 3 months duration[78, 81]. Soaking the seed for 3 - 6 seconds in boiling water may speed up the germination process[11]. The seed is best sown as soon as it is ripe in a cold frame. Some might germinate in the following spring, though most will take another year. Another possibility is to harvest the seed 'green' (when the embryo has fully formed but before the seedcoat has hardened). The seedlings can be potted up into individual pots when they are large enough to handle. Grow on in pots until large enough, then plant out in early summer. When stored dry, the seed can remain viable for several years[1]. Cuttings of mature wood, 5 - 10cm with a heel, September/October in a cold frame. Plant out in the following autumn[1, 78]. Layering in September/October. Takes 12 months[78].

nwatta Succeeds in dry soils. Succeeds in most soils, including chalk, if they are well drained[1, 11, 200], preferring a neutral or slightly alkaline soil[11]. Trees are fairly fast growing for a Juniper, and are also long-lived in their native habitats[227]. They grow better in dry areas with hot summers, western Britain is generally to cool and wet for this species to thrive[200]. Plants are resistant to honey fungus[88]. This species is closely related to *J. occidentalis*[11]. The seed matures in 1 year[200]. Some fruit is produced

most years, but heavy crops only occur every 2 - 3 years[229]. Dioecious. Male and female plants must be grown if seed is required. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is flat with shallow roots spreading near the soil surface [2-1].

5.2.228 Primula veris

Cowslip, Cowslip primrose
4 tlin 8 cyuc 3 kcaak 0 tcan 3 dwat 0.3 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnykfrip hpa7tli flatprikliw
wisslip hpa7tmwatli fyfxre7t hjonli

drutta *Primula veris* is a PERENNIAL growing to 0.3 m (1ft) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to May, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Some people are allergic to the stamens of this plant, though such cases are easily treated[7]. Saponins may cause hypotension. Excessive/prolonged use may interfere with high blood pressure treatments. Possible Gastrointestinal irritation [301].

kaakta Edible Parts: Flowers LeavesEdible Uses: Tea-Young leaves - raw or cooked in soups etc[4, 7, 115, 148, 183]. They are not that tasty, but are available in late winter which adds somewhat to their value[K]. The fresh or dried leaves are used as a tea substitute[177, 183]. Flowers - raw, cooked or used in preserves, as a garnish etc[4, 183]. They make an ornamental addition to the salad bowl[238, K]. This species has become much less common in the past 100 years due to habitat destruction, over-collecting from the wild and farming practices. When it was more abundant, the flowers were harvested in quantity in the spring and used to make a tasty wine with sedative and nerve properties[238]. A related species *Primula elatior* is listed by the Council of Europe as a natural food flavouring [301].

dwatta Anodyne Antianxiety Antiechymotic Antiinflammatory Antispasmodic Diaphoretic Diuretic Expectorant Sedative SternutatoryCowslips are an underused but valuable medicinal herb. They have a very long history of medicinal use and have been particularly employed in treating conditions involving spasms, cramps, paralysis and rheumatic pains[238]. The plant contains saponins, which have an expectorant effect, and salicylates which are the main ingredient of aspirin and have anodyne, anti-inflammatory and febrifuge effects[238]. This remedy should not be prescribed for pregnant women, patients who are sensitive to aspirin, or those taking anti-coagulant drugs such as warfarin[238]. The flowers and the leaves are anodyne, diaphoretic, diuretic and expectorant[7, 9, 21, 165]. They are harvested in the spring and can be used fresh or dried[238]. The yellow corolla of the flower is antispasmodic and sedative[4]. They are recommended for treating over-activity and sleeplessness, especially in children[254]. They are potentially valuable in the treatment of asthma and other allergic conditions[254]. At one time an oil was produced by maceration of the flowers, this has an antiechymotic effect (treats bruising)[7]. The root contains 5 - 10% triterpenoid saponins which are strongly expectorant, stimulating a more liquid mucous and so easing the clearance of phlegm [254]. It has been dried and made into a powder then used as a sternutatory[7]. The root is also mildly diuretic, antirheumatic and slows the clotting of blood[9, 254]. It is used in the treatment of chronic coughs (especially those associated with chronic bronchitis and catarrhal congestion), flu and other febrile conditions[9]. The root can be harvested in the spring or autumn and is dried for later use[9]. The leaves have similar medicinal properties to the roots but are weaker in action[254]. A homeopathic remedy is made from the plant[9]. It is used in the treatment of kidney complaints and catarrh[9]. The German Commission E Monographs, a therapeutic guide to

non-destructive management systems that are used in cultivation [1-1]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [2-1].

5.2.187 Chenopodium giganteum

Tree Spinach
4 tlin 8 cyuc 3 kcaak 0 tcan 0 dwat 2.4 m hkuc
htut cyutli tcup hwicli hrasjlutnyk hpa7tli flatprikliw
hpa7tmwatli xre7t hjonli

drutta *Chenopodium giganteum* is an ANNUAL growing to 2.4 m (7ft 10in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista The leaves and seeds of all members of this genus are more or less edible. However, many of the species in this genus contain saponins, though usually in quantities too small to do any harm. Although toxic, saponins are poorly absorbed by the body and most pass straight through without any problem. They are also broken down to a large extent in the cooking process. Saponins are found in many foods, such as some beans. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K]. The plants also contain some oxalic acid, which in large quantities can lock up some of the nutrients in the food. However, even considering this, they are very nutritious vegetables in reasonable quantities. Cooking the plants will reduce their content of oxalic acid. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kaakta Edible Parts: Leaves SeedEdible Uses: Leaves - cooked[46, 61, 105, 177]. Of excellent quality, they are a spinach substitute[74]. The raw leaves should only be eaten in small quantities, see the notes above on toxicity. Seed - cooked. Ground into a powder and used with wheat or other cereals in making bread etc. The seed is small and fiddly, about 1.5mm in diameter[266], it should be soaked in water overnight and thoroughly rinsed before it is used in order to remove any saponins.

tcanta Dye WoodGold/green dyes can be obtained from the whole plant[168]. The stout stems have been used for making walking sticks[266].

nrakta E. Asia - N. India. Naturalized in S. France[50]. ksacta Weed infested places[74].

propta Seed - sow spring in situ. Most of the seed usually germinates within a few days of sowing.

nwatta An easily grown plant, succeeding in most soils but disliking shade[1, 200]. It prefers a moderately fertile soil[200]. This species is closely related to *C. album*[50], and was probably derived from it through cultivation[266]. The tree spinach is sometimes cultivated for its edible leaves[74], there are some named varieties[183]. 'Magentaspreen' is a vigorous plant growing 1.5 metres tall. It has large leaves, the new growth is a brilliant magenta colour. Tastiest when young, the leaves are eaten raw or cooked like spinach[183]. A warm climate is required in order to ripen the seed[74].

5.2.188 Viburnum edule

Mooseberry, Squashberry
4 tlin 8 cyuc 3 kcaak 3 tcan 1 dwat 2.5 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnykfrip hpa7tli flatprikliw
hpa7tmwatli dyatxre7t hjonli

drutta *Viburnum edule* is a deciduous Shrub growing to 2.5 m (8ft 2in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in June, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy)

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

pcista Although no records of toxicity have been seen for this species, it is closely related to *V. opulus*, the raw fruit of which can cause nausea in some people if it is eaten in large quantities, although the cooked fruit is perfectly alright[65, 76].

kaakta Edible Parts: Flowers FruitEdible Uses: Fruit - raw or cooked[11, 62, 101, 257]. The fully ripe fruits are mildly acid with a pleasant taste[183]. The ovoid fruit is about 8mm long and contains a single large seed[200]. The fruit can also be dried for winter use[183]. It is highly valued for jam[43]. It is best before a frost and with the skin removed[85, 172]. Another report says that the native Americans would often not harvest the fruit until it had been frosted[257]. Some caution is advised, see the notes above on toxicity. Flowers - used in fritters[172].

tcanta BasketryThe stems have been used to reinforce birch bark basket rims[257].

dwatta Antispasmodic Astringent Dysentery Odontalgic SalveThe bark is antispasmodic and astringent[172, 257]. An infusion of the crushed inner bark has been used in the treatment of dysentery and has also been used as a purgative[257]. The bark has been chewed and the juice swallowed in the treatment of whooping cough and 'cold on the lungs'[257]. A decoction of the stems has been used in the treatment of coughs[257]. An infusion of the leaves and stems has been used as a gargle in the treatment of sore throats[257]. The twig tips have been chewed and the juice swallowed in the treatment of sore throats[257]. A poultice of the chewed, unopened flower buds has been applied to lip sores[257]. A decoction of the roots has been used to treat sickness associated with teething[257].

nrakta E. Asia. Eastern N. America. ksacta Woods, thickets and cool mountain slopes[43].

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

nwatta An easily grown plant, it succeeds in most soils but is ill-adapted for poor soils and for dry situations[1]. It prefers a deep rich loamy soil in sun or semi-shade[11, 200]. Grows well in heavy clay soils. Prefers a slightly acidic soil[172]. Best if given shade from the early morning sun in spring[200]. Plants are possibly self-incompatible[11] and may need to grow close to a genetically distinct plant in the same species in order to produce fruit and fertile seed[11, 200]. Closely allied to *V. opulus*, but this species has no sterile flowers in the inflorescence and is a superior fruiting form[11].

5.2.189 Berberis x stenophylla

4 tlin 8 cyuc 3 kcaak 3 tcan 2 dwat 2.5 m hkuc
hmimhtut cyutli tcup hwicli hyishrasjlutnykfrip hpa7tli flatprikliw
hpa7tmwatli fyfxre7t hjonli

drutta *Berberis x stenophylla* is an evergreen Shrub growing to 2.5 m (8ft) by 2.5 m (8ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf all year, in flower from April to May, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. A delicious sub-acid flavour, though there are a lot of seeds to relatively little flesh[K]. Children generally love this fruit, along with some adults, though most adults seem to prefer it cooked in pies, preserves etc[K]. The fruit is not always very freely borne, growing the plants near to *B. darwinii* (which is one of its parents) seems to increase the yield[K]. The fruits are about 7mm long[200].

tcanta Dye Hedge HedgePlants are very tolerant of trimming and can be grown as a medium-size hedge. Their long arching branches look especially nice if the plants are allowed to grow as an untrimmed informal hedge that is very resistant to maritime exposure[29, 75]. It succeeds on top of Cornish hedges. The prickles make it impenetrable though it can be invasive. There are some named varieties of prostrate growth that are suitable for use as a ground cover[208]. 'Corallina' and 'Prostrata' have been especially mentioned[208]. A yellow dye is obtained from the root.

dwatta Antibacterial Cancer DysenteryBerberine, universally present in rhizomes of *Berberis* species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with *Glycyrrhiza* species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta A garden hybrid, *B. darwinii*. x *B. empetrifolia*. ksacta Not known in the wild.

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. This plant does not breed true from seed because it is a hybrid species. Most of the seedlings revert back to one of the parents, usually *B. darwinii*[11]. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78]. Suckers, removed in late autumn/early winter and planted out in situ or potted up and planted out in late spring[200].

nwatta Prefers a warm moist loamy soil and light shade but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. Tolerates maritime exposure[75, 200]. Fairly slow growing[75]. Plants are hardy to about -15°C[184]. A very ornamental plant[1], there are many named varieties[182]. Plants sucker freely, forming thickets[182]. A good bee plant[108], the flowers are very fragrant. Plants can be pruned back quite severely, they resprout well from the base[200].

5.2.190 Mahonia aquifolium

Oregon Grape, Hollyleaved barberry, Oregon Holly Grape, Oregon Holly

4 tlin 8 cyuc 3 kcaak 3 tcan 3 dwat 2 m hkuc pcmhmimhtu cyutli kyuctup hwicli hrasljutnyikfrp hpa7tli flatprikrlwis hpa7mwatli fyifxre7t hjonli

drutta *Mahonia aquifolium* is an evergreen Shrub growing to 2 m (6ft) by 1.5 m (5ft) at a fast rate. See above for

USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, in flower from January to May, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Barberry, goldenseal, oregon grape and other plants containing Berberine should be avoided during pregnancy and breastfeeding. Avoid if over active thyroid gland. High doses cause vomiting, lowered blood pressure, reduced heart rate, lethargy, nose bleed, skin and eye irritation and kidney infection. Liquorice as *Glycyrrhiza* species nullify berberine effects [301].

kcakta Edible Parts: Flowers FruitEdible Uses: Drink-Fruit - raw or cooked[2, 3, 5, 95]. The fruit is almost as large as a blackcurrant and is produced in large bunches so it is easy to harvest[K]. It has an acid flavour, but it is rather nice raw and is especially good when added to a porridge or muesli[K]. Unfortunately, there is relatively little flesh and a lot of seeds, though some plants have larger and juicier fruits[K]. The cooked fruit tastes somewhat like blackcurrants[K]. The fruit can also be dried and stored for later use[257]. Flowers - raw. They can also be used to make a lemonade-like drink[183].

tcanta Dye Hedge HedgeA yellow dye is obtained from the inner bark of the stem and roots[99, 101, 257]. It is green according to another report[168]. Dark green, violet and dark blue-purple dyes are obtained from the fruit[168]. A green dye is obtained from the leaves[168]. This species can be grown as a low hedge and does not need trimming. Because of its suckering habit, it also makes a good dense ground cover plant though it can be slow to become established[197, 200].

dwatta Alternative Antibacterial Antipsoriatic Antiseborrhoeic Antitumour Blood tonic Cholagogue Diuretic Dysentery Laxative Ophthalmic TonicOregon grape was often used by several native North American Indian tribes to treat loss of appetite and debility[254]. Its current herbal use is mainly in the treatment of gastritis and general digestive weakness, to stimulate the kidney and gallbladder function and to reduce catarrhal problems[254, 257]. The root and root bark is alterative, blood tonic, cholagogue, diuretic, laxative and tonic[4, 21, 165, 257]. It improves the digestion and absorption and is taken internally in the treatment of psoriasis, syphilis, haemorrhages, stomach complaints and impure blood conditions[4, 238]. Externally, it has been used as a gargle for sore throats and as a wash for blurry or blood-shot eyes[257]. The roots are harvested in late autumn or early spring and dried for later use[238]. The fruit is an excellent gentle and safe laxative[257]. Berberine, universally present in rhizomes of *Mahonia* species, has marked antibacterial effects[218] and is used as a bitter tonic[213]. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with *Glycyrrhiza* species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218]. The root and root bark are best harvested in the autumn[213].

nrakta Western N. America. Naturalized in Britain. ksacta Mixed coniferous woods to 2000 metres. It is found in woods and hedgerows in Britain[17].

propta Seed - best sown as soon as it is ripe in a cold frame[78]. It usually germinates in the spring[K]. 'Green' seed (harvested when the embryo has fully developed but before the seed case has dried) should be sown as soon as it is harvested and germinates within 6 weeks[K]. Stored seed should be sown as soon as possible in late winter or spring. 3 weeks cold stratification will improve its germination, which should take place in 3 - 6 months at 10°C. Prick out the seedlings when they are large enough to handle and grow them on in a cold frame for at least their first winter. Plant them out in late spring or early summer. Division of suckers in spring[78]. Whilst they can be placed direct into their permanent positions, better results are achieved if they are potted up and placed in a frame until established[11]. Leaf cuttings in the autumn.

nwatta Landscape Uses:Border, Foundation, Pest tolerant, Massing, Specimen, Woodland garden. A very easy plant

perhaps their size could be improved in cultivation[K]. Edible young shoots - raw[74]. A tea is made from the leaves.

tcanta Cleanser TanninA sprig placed in the shoe can help prevent blisters[66]. An infusion of the leaves makes an excellent skin cleansing lotion[66], it is also used cosmetically as a soothing lotion for reddened skin and for the delicate skins of babies[7]. All parts of the plant contain tannin, though the report does not give quantities[4]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Analgesic Antidiarrhoeal Antispasmodic Astrigent Diuretic Food care Haemostatic Odontalgic TonicContemporary medical herbalists believe that silverweed's main medicinal value lies in its astringency. It is less astringent than the related *P. erecta*, but it has a gentler action within the gastro-intestinal tract[254]. The whole plant is antispasmodic, mildly astringent, diuretic, food care, haemostatic, odontalgic and tonic[4, 7, 9, 21]. A strong infusion is used to check the bleeding of piles and to treat diarrhoea, it is also used as a gargle for sore throats[4]. Externally, it is used as a powder to treat ulcers and haemorrhoids whilst the whole bruised plant, placed over a painful area, will act as a local analgesic[7, 254]. The roots are the most astringent part of the plant[4], they are harvested in late summer or autumn and dried for later use[254]. The leaves are harvested in early summer and dried for later use[4]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve *Potentilla anserina* Silverweed for diarrhoea, inflammation of the mouth and pharynx, premenstrual syndrome (see [302] for critics of commission E).

nrakta Europe, including Britain, from Iceland south and east to Iran, the Himalayas, Manchuria, Japan. ksacta Ditches and moist calcareous soils[7]. A common weed of cultivation[1].

propta Seed - sow early spring or autumn in a cold frame. Prick out the seedlings into individual pots once they are large enough to handle and plant them out into their permanent positions in the summer. Division in spring. Division is also very easy at almost any time the plant is in growth. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta A very easily grown plant, succeeding in almost any soil, thriving in moist clays, though rather dwarfed in dry dusty soils[4]. It grows best in a well-drained loam, preferring a position in full sun but tolerating shade[1]. Prefers an alkaline soil but tolerates a slightly acid soil[200]. Silverweed was formerly cultivated for its edible root[5, 67]. It is still possibly cultivated in parts of Scotland (1992)[183]. This plant spreads vigorously by its running roots and can be very invasive[1, 4]. It grows well in a meadow, or places where the grass is only cut occasionally[K]. Members of this genus are rarely if ever troubled by browsing deer[233]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2].

5.2.226 Malva sylvestris

Mallow, High mallow, French Hollyhock, Common Mallow, Tree Mallow, Tall Mallow

4 tlin 8 cyuc 3 kcaak 3 tcan 3 dwat 0.5 m hkuc hmimhtu cyutli tcup hwicli hrasljutnyik hpa7tli flatprikrlwis hpa7mwatli fyifxre7t hjonli

drutta *Malva sylvestris* is a BIENNIAL/PERENNIAL growing to 0.5 m (1ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to September, and the seeds ripen from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can

grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista When grown on nitrogen rich soils (and particularly when these are cultivated inorganically), the plant tends to concentrate high levels of nitrates in its leaves[76]. The leaves are perfectly wholesome at all other times. Avoid with gallstones.

kcakta Edible Parts: Flowers Leaves SeedEdible Uses: TeaLeaves - raw or cooked[2, 4, 7, 9, 94, 183]. Mucilaginous with a mild pleasant flavour, they are nice in soups where they act as a thickener[5]. The young leaves also make a very acceptable substitute for lettuce in a salad[K]. Immature seed - raw[183]. Used as a nibble[183], the seeds have a nice nutty flavour[12] but are too fiddly for most people to want to gather in quantity[K]. Flowers - raw. Added to salads or used as a garnish[183]. A pleasant mild flavour, with a similar texture to the leaves, they make a pleasant and pretty addition to the salad bowl[K]. The leaves are a tea substitute[46, 183].

tcanta Dye Fibre LitmusCream, yellow and green dyes can be obtained from the plant and the seed heads[168]. A tincture of the flowers forms a very delicate test for alkalis[4, 115]. The leaves are used to relieve insect bites and stings[53]. A fibre obtained from the stems is useful for cordage, textiles and paper making[115].

dwatta Antiphlogistic Astringent Demulcent Diuretic Emollient Expectorant Laxative SalveAll parts of the plant are antiphlogistic, astringent, demulcent, diuretic, emollient, expectorant, laxative, salve[4, 7, 9, 21, 46, 222, 238]. The leaves and flowers can be eaten as part of the diet, or a tea can be made from the leaves, flowers or roots[222]. The leaves and flowers are the main part used, their demulcent properties making them valuable as a poultice for bruise, inflammations, insect bites etc, or they can be taken internally in the treatment of respiratory system diseases and problems with the digestive tract[4, 238, 254]. When combined with eucalyptus it makes a good remedy for coughs and other chest ailments[254]. Mallow has similar properties, but is considered to be inferior to the marsh mallow (*Althaea officinalis*) and are seldom used internally[4]. The plant is an excellent laxative for young children[7]. The leaves can be used fresh whenever they are available or can be harvested in the spring and dried for later use[254]. The flowers are harvested in the summer and can be dried for later use[254]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve *Malva sylvestris* for cough, bronchitis, inflammation of the mouth and pharynx (see [302] for critics of commission E).

nrakta Most of Europe, including Britain. ksacta Waste ground, field verges and roadsides, avoiding acid soils[7, 9, 17].

propta Seed - sow early spring in situ. Germination should take place within 2 weeks.

nwatta Landscape Uses:Border, Massing. A very easily grown plant, succeeding in ordinary garden soil[1] and in poor soils[238]. It prefers a reasonably well-drained and moderately fertile soil in a sunny position[200], where it will produce a better crop of salad leaves[K]. Plants are hardy to about -20°C[187]. There are some named forms, selected for their ornamental value[187]. 'Mauritiana' is larger than the type with much more ornamental flowers[187]. The flavour of the leaves and flowers is considered by many to be superior to the type species[183]. Plants seem to be immune to the predations of rabbits[233]. Prone to infestation by rust fungus[200]. Special Features: Not North American native, Naturalizing, Attractive flowers or blooms.

5.2.227 Juniperus monosperma

One-Seed Juniper

4 tlin 8 cyuc 3 kcaak 3 tcan 2 dwat m hkuc htut cyutli hgatkyuctup hwicli hrasljutnyik hpa7tli flatprikrlwis hpa7mwatli nyanhjen hjonli

drutta *Juniperus monosperma* is an evergreen Tree growing to 18 m (59ft 1in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in leaf all year, in flower in April, and the seeds ripen in October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers

5.2.223 Mahonia repens

Creeping Oregon Grape, Creeping barberry, Grape Oregon
4 tin 8 cyuc 3 kcaak 4 tcan 3 dwat 0.3 m hkuc
hmimhtut cyutli kyuctup hwicli hrasljutnykfrp hpa7tli flat-
prikliwis hpa7tmwatli xre7t hjonli

drutta Mahonia repens is an evergreen Shrub growing to 0.3 m (1ft) by 2 m (6ft 7in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by In-sects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Fruit OilEdible Uses: OilFruit - raw or cooked[85, 183]. An acid flavour but it is rather nice raw, especially when added to mesuili or porridge[K]. Unfortunately, there is relatively little flesh and a lot of seeds[K]. Used for making jams, jellies etc. They can also be made into a refreshing lemonade-like beverage[183]. When sugar is added, the fruit juice is similar to grape juice[212]. The fruit is about 9mm in diameter[200].

tcanta Dye Oil Soil stabilizationA yellow dye is obtained from the inner bark of the stem and roots[155, 257]. It is green[168]. Dark green, violet and dark blue-purple dyes are obtained from the fruit[168]. A green dye is obtained from the leaves[168]. Plants form suckers freely, making a good dense ground cover[11, 200], though they can be slow to become established[197] and will need weeding for their first few years after planting out[K]. The sub-species *M. repens rotundifolia* has been especially recommended[197]. A useful plant for preventing soil erosion on slopes[155].

dwatta Alternative Anaphrodisiac Antibacterial Antiseptic Antitumor Cholagogue Depurative Diuretic Dysentery Expecto- rant Febrifuge Laxative Salve TonicThe root and root bark is alternative, anaphrodisiac, antiseptic, cholagogue, depurative, diuretic, expectorant, febrifuge, laxative and tonic[4, 238]. It improves the digestion and absorption and is taken internally in the treatment of coughs, fevers, psoriasis, syphilis, haemorrhages, stomach complaints, kidney problems and impure blood conditions[4, 238, 257]. Externally, it is used as an antiseptic and healing wash or poultice on wounds and rheumatic joints[257]. The roots are harvested in late autumn or early spring and dried for later use[238]. A poultice of the fresh berries has been applied to boils[257]. Berberine, universally present in rhizomes of Mahonia species, has marked antibacterial effects[218] and is used as a bitter tonic[213]. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Licorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumor activity[218]. The root and root bark are best harvested in the autumn[213].

nrakta Western N. America. ksacta Hills and slopes, often in partial shade[85], usually on dry slopes[155].

propta Seed - best sown as soon as it is ripe in a cold frame[78]. It usually germinates in the spring[K]. 'Green' seed (harvested when the embryo has fully developed but before the seed case has dried) should be sown as soon as it is harvested and germinates within 6 weeks[K]. Stored seed should be sown as soon as possible in late winter or spring. 3 weeks cold stratification will improve its germination, which should take place in 3 - 6 months at 10°C. Prick out the seedlings when they are large enough to handle and grow them on in a cold frame for at least their first winter. Plant them out in late spring or early summer. Division of suckers in spring[78]. Whilst they can be placed direct into their permanent positions, better results are achieved if they are potted up and placed in a frame until established[11]. Leaf cuttings in the autumn.

nwatta Landscape Uses:Border, Erosion control, Ground cover, Massing. An easily grown plant, it thrives in any good garden soil[11], preferring one on the dryish side. Grows well in heavy clay soils. Succeeds in the light shade of trees[K]. This species is hardy to about -15°C if growing in a sheltered position[184]. Established plants sucker freely and form quite dense thickets[200]. The flowers are scented[245]. Resistant to honey fungus[88]. Special Features: North American native, Attractive flowers or blooms.

The plant is heat tolerant in zones 8 through 3. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. An evergreen. A climbing plant, forming a colony from shoots away from the crown but with a limited spread [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2].

5.2.224 Hydrophyllum canadense

John's Cabbage, Bluntleaf waterleaf
4 tin 8 cyuc 3 kcaak 0 tcan 0 dwat 0.3 m hkuc
hmim cyutli tcup hwicli hrasljutnyk hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Hydrophyllum canadense is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: Leaves RootEdible Uses: Leaves - raw or cooked[105, 177, 183]. A delicate potherb[183]. Only use when young, the leaves become bitter with age[159]. Root - cooked[2]. Only eaten in times of scarcity[161].

nrakta Eastern N. America - Vermont to New York, North Carolina, Ontario, Illinois and Kentucky. ksacta Damp rich woodland[43].

propta Seed - best sown as soon as it is ripe in a cold frame. The seed usually germinates in early spring. Sow stored seed as early in the year as possible. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring or autumn[200]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Requires a moist humus-rich soil in semi-shade[200]. Plants are growing well at Kew[K]. Slugs are particularly fond of this plant and will soon destroy it if given a chance[K].

5.2.225 Potentilla anserina

Silverweed
4 tin 8 cyuc 3 kcaak 2 tcan 3 dwat 0.3 m hkuc
hmimhtut cyutli tcup hwicli hrasljutnyk hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta Potentilla anserina is a PERENNIAL growing to 0.3 m (1ft) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

pcista Possible stomach irritation.

kcakta Edible Parts: Leaves RootEdible Uses: TeaRoot - raw or cooked[66, 74, 183]. It can also be dried and ground into a powder then used in soups etc or mixed with cereals[5, 12, 13, 54]. A nice taste, crisp and nutty with a somewhat starchy flavour[85, 183]. The roots are rather thin, though

to grow, thriving in any good garden soil[11, 200] and tolerating dense shade under trees[1, 28]. It grows well in heavy clay soils and also succeeds in dry soils if it is given a good mulch annually[197]. It dislikes exposure to strong winds[K]. Plants are hardy to about -20°C[184]. Very tolerant of pruning, plants can be cut back into old wood if they grow too large and straggly[238]. Spring is the best time to do this[238]. Suckers are fairly freely produced, with established plants forming dense thickets[200]. Most plants grown under this name are casual hybrids with *M. repens*[67]. This species is easily confused with *M. pinata*[67], with which it also hybridizes[200]. The flowers are delicately scented[245]. A number of named forms have been developed for their ornamental value[182]. This species is notably resistant to honey fungus[88, 200]. This plant is the state flower of Oregon[95]. Special Features: North American native, Fragrant flowers, Attractive flowers or blooms. The plant is heat tolerant in zones 9 through 6. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. An evergreen. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2].

5.2.191 Scirpus lacustris

Bulrush
4 tin 8 cyuc 3 kcaak 0 tcan 1 dwat 2.5 m hkuc
hmimhtut cyutli tcuphja7nhs6s hwicli hrasljutnyk hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Scirpus lacustris is a PERENNIAL growing to 2.5 m (8ft 2in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from June to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can grow in water.

kcakta Edible Parts: Leaves Pollen Root Seed StemEdible Uses: Root - raw or cooked[2, 85, 95, 183]. Rich in starch, it can be dried and ground into a powder or made into a syrup[13, 85, 95, 183]. The buds at the end of the rhizomes are crisp and sweet, making excellent eating raw[183]. Young shoots - raw or cooked[85, 183]. Used in spring. Seed - ground up into a powder and mixed with flour for use in making cakes etc[85, 183]. The seed is small and rather fiddly to harvest and utilize. Base of mature stems - raw or cooked. Somewhat tough[85]. Pollen - raw or cooked. Rich in pollen, it is mixed with flour and used in making cakes etc[85, 183].

tcanta Paper Thatching WeavingThe stems are frequently used for making matting, chair bottoms etc and thatching[1, 4, 23, 85, 100, 115]. They were at one time imported in large quantities for this purpose[4]. The pith of the stems is used in paper making[100].

dwatta Astringent Cancer DiureticThe roots are astringent and diuretic[240]. They were formerly employed medicinally but have fallen into disuse[4]. This plant is a traditional medicine for cancer[218].

nrakta Europe, incl Britain, south and east from Lapland to Africa and Asia. N. and C. America, Polynesia. ksacta Bogs, shallow pond margins, rivers and lakes, usually where there is abundant silt, in acid or calcareous conditions[1, 17].

propta Seed - sow in a cold frame as soon as it is ripe in a pot standing in 3cm of water. Only just cover the seed with soil[200]. The seed usually germinates fairly quickly. Prick out the plants when large enough to handle and plant out in their permanent positions in early summer. Division in

spring. Very easy, larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Succeeds in any wet to moisture retentive soil, pond margins and shallow water in full sun or shade[1, 200]. Plants can succeed in fairly deep water. Hardy to about -25°C[187]. Some named forms have been selected for their ornamental value[187].

5.2.192 Rosa nutkana

Nootka Rose, Bristly Nootka rose
4 tin 8 cyuc 3 kcaak 4 tcan 2 dwat 2.7 m hkuc
hmimhtut cyutli tcup hwicli hrasljutnykfrp hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta Rosa nutkana is a deciduous Shrub growing to 2.7 m (8ft 10in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from June to July, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista There is a layer of hairs around the seeds just beneath the flesh of the fruit. These hairs can cause irritation to the mouth and digestive tract if ingested.

kcakta Edible Parts: Flowers Fruit Seed StemEdible Uses: TeaFruit - raw or cooked[2, 101, 118, 161, 257]. The taste is best after a frost[172]. Juicy, pleasantly acid and a good source of vitamin C[183]. The fruit can be dried, powdered and added to tea as a flavouring or used in its own right as a fruity-flavoured tea[21, 101, 183]. The fruit is about 20mm in diameter[200], but there is only a thin layer of flesh surrounding the many seeds[K]. Some care has to be taken when eating this fruit, see the notes above on known hazards. Petals - raw. The petals are pleasantly aromatic, but you need to remove the bitter white base[172]. Young shoots - raw or cooked. Peeled and eaten in spring when they are still tender[101, 172, 177, 183, 257]. The seed is a good source of vitamin E, it can be ground and mixed with flour or added to other foods as a supplement[102, 183]. Be sure to remove the seed hairs[102]. The peeled stems are used to make a beverage[257]. The leaves are used to make a tea[257].

tcanta Hedge HedgeThe plant makes a good informal hedge[1].

dwatta Analgesic Astringent Birthing aid Cancer Foot care Ophthalmic Stings Vitamin C Women's complaintsAn infusion of the roots and sprouts has been used as an eyewash for sore eyes[257]. A decoction of the roots has been used by women after giving birth and also in the treatment of sore throats[257]. A decoction of the bark has been taken to ease the labour pains of childbirth[257]. A poultice of the chewed leaves has been used to alleviate the pain of bee stings[257]. A decoction of the branches, combined with chokecherry (*Prunus virginiana*) and red willow (*Salix bonplandiana*), has been used in the treatment of various women's complaints, diarrhoea and vomiting[257]. The leaves have been placed in shoes as a protection from athletes foot[257]. The fruit of many members of this genus is a very rich source of vitamins and minerals, especially in vitamins A, C and E, flavanoids and other bio-active compounds. It is also a fairly good source of essential fatty acids, which is fairly unusual for a fruit. It is being investigated as a food that is capable of reducing the incidence of cancer and also as a means of halting or reversing the growth of cancers[214].

nrakta North-western N. America. ksacta Woods and open places at moderate elevations[60].

propta Seed. Rose seed often takes two years to germinate. This is because it may need a warm spell of weather after a cold spell in order to mature the embryo and reduce the seedcoat[80]. One possible way to reduce this time is to scarify the seed and then place it for 2 - 3 weeks in damp peat at a temperature of 27 - 32°C (by which time the seed should have imbibed). It is then kept at 3°C for the next 4 months by which time it should be starting to germinate[80]. Alternatively, it is possible that seed harvested 'green' (when it is fully developed but before it has dried on the plant) and sown immedi-

ately will germinate in the late winter. This method has not as yet(1988) been fully tested[80]. Seed sown as soon as it is ripe in a cold frame sometimes germinates in spring though it may take 18 months. Stored seed can be sown as early in the year as possible and stratified for 6 weeks at 5°C[200]. It may take 2 years to germinate[200]. Prick out the seedlings into individual pots when they are large enough to handle. Plant out in the summer if the plants are more than 25cm tall, otherwise grow on in a cold frame for the winter and plant out in late spring. Cuttings of half-ripe wood with a heel, July in a shaded frame. Overwinter the plants in the frame and plant out in late spring[78]. High percentage[78]. Cuttings of mature wood of the current seasons growth. Select pencil thick shoots in early autumn that are about 20 - 25cm long and plant them in a sheltered position outdoors or in a cold frame[78, 200]. The cuttings can take 12 months to establish but a high percentage of them normally succeed[78]. Division of suckers in the dormant season. Plant them out direct into their permanent positions. Layering. Takes 12 months[11].

nwatta Succeeds in most soils[11], preferring a circumneutral soil and a sunny position[200]. Grows well in heavy clay soils. Prefers a slightly acid soil[14]. Dislikes water-logged soils[200]. Grows well with alliums, parsley, mignonette and lupins[18, 20]. Garlic planted nearby can help protect the plant from disease and insect predation[18, 20]. Grows badly with boxwood[18]. A very ornamental plant[1], it fruits well in Britain[11]. This plant is often wrongly grown under the name *R. californica*[200]. Hybridizes freely with other members of this genus[80]. Plants in this genus are notably susceptible to honey fungus[200].

5.2.193 Phytolacca americana

Pokeweed, American pokeweed, Garnet, Pigeon Berry, Poke 4 tin 8 cyuc 3 kcaak 2 tcan 3 dwat 2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliw hpa7tmwatli xre7t hjonli

drutta Phytolacca americana is a PERENNIAL growing to 2 m (6ft) by 1.5 m (5ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from August to September, and the seeds ripen from September to November. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The leaves are poisonous[21, 62, 76, 95]. They are said to be safe to eat when young, the toxins developing as the plants grow older. Another report says that the seeds and root are poisonous. The plant sap can cause dermatitis in sensitive people[222]. The plant contains substances that cause cell division and can damage chromosomes. These substances can be absorbed through any abrasions in the skin, potentially causing serious blood aberrations, and so it is strongly recommended that the people wear gloves when handling the plant[222, 274]. Avoid during pregnancy. Even children consume even 1 berry emergency poison treatment should be instituted. Up to 10 berries are considered harmless for adults [301].

kcakta Edible Parts: Fruit LeavesEdible Uses: ColouringLeaves - they must be cooked and even then it is best to change the water once[1, 2, 4, 33, 95]. They are used like spinach[183]. Only the young leaves should be used since they become toxic with age[102]. Caution is advised, see the notes above on toxicity. Young shoots - cooked[20, 33, 62, 102]. An asparagus substitute[183], they are delicious[159]. The shoots are sometimes blanched before using, or forced in cellars to provide an early crop[183]. The tender clear inner portion of the stem can be rolled in cornmeal and fried[183]. Although cultivated on a small scale in N. America for its shoots, caution is advised, see notes above. A nutritional analysis is available[218]. Fruit - cooked and used in pies[159, 213]. Poisonous raw, causing vomiting and diarrhoea. Even the cooked fruits should be viewed with caution. The fruit is a berry about 12mm in diameter[200]. A red dye is obtained from the fruit and used as a food colouring[183].

tcanta Ink Insecticide SoapA red ink and a dye are obtained from the fruit[46, 50, 57, 100, 102, 159, 169]. A beautiful colour, though it is not very permanent[4]. It makes a

good body paint, washing off easily when no longer required, though the slightly toxic nature of the berries should be remembered[K]. The rootstock is rich in saponins and can be used as a soap substitute[169]. Cut the root into small pieces and simmer it in boiling water to obtain the soap. The plant is currently (1980) being evaluated for its snail-killing properties[213].

dwatta Alterative Anodyne Antiinflammatory Antirheumatic Antiviral Cancer Cathartic Dysentery Expectorant Homeopathy Hypnotic Narcotic PurgativePokeweed has a long history of medicinal use, being employed traditionally in the treatment of diseases related to a compromised immune system. The plant has an interesting chemistry and it is currently (1995) being investigated as a potential anti-AIDS drug[238]. It contains potent anti-inflammatory agents, antiviral proteins and substances that affect cell division[238]. These compounds are toxic to many disease-causing organisms, including the water snails that cause schistosomiasis[238]. All parts of the plant are toxic, an excess causing diarrhoea and vomiting[238]. This remedy should be used with caution and preferably under the supervision of a qualified practitioner. It should not be prescribed for pregnant women[238]. The root is alterative, anodyne, anti-inflammatory, cathartic, expectorant, hypnotic, narcotic and purgative[4, 21, 46, 61, 165, 192, 238]. The dried root is used as an anodyne and anti-inflammatory[213]. The root is taken internally in the treatment of auto-immune diseases (especially rheumatoid arthritis), tonsillitis, mumps, glandular fever and other complaints involving swollen glands, chronic catarrh, bronchitis etc[238]. The fresh root is used as a poultice on bruises, rheumatic pains etc, whilst a wash made from the roots is applied to swellings and sprains[222]. The root is best harvested in the autumn and can be dried for later use[238]. The fruit has a similar but milder action to the roots[238]. The juice is used in the treatment of cancer, haemorrhoids and tremors[213]. A poultice made from the fruit is applied to sore breasts[222]. A tea made from the fruit is used in the treatment of rheumatism, dysentery etc[222]. The plant has an unusually high potassium content and the ashes, which contain over 45% caustic potash, have been used as a salve for ulcers and cancerous growths[232]. The leaves are cathartic, emetic and expectorant[222]. A homeopathic remedy is made from the fresh root[232]. Its main action is on the throat, breast, muscular tissues and the joints[232].

nrakta Northern and Central N. America. Occasionally naturalized in Britain[17]. ksacta Damp rich soils in clearings, woodland margins and roadsides[43]. Disturbed areas, pastures, clearings, thickets, woodland borders and roadsides from sea level to 1400 metres[270].

propta Seed - sow autumn or spring in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. If you have sufficient seed, it might be worthwhile trying an outdoor sowing in a seed bed in early spring. Grow the plants on in the seedbed for their first year and plant them out the following spring. Division in March or October. Use a sharp spade or knife to divide the rootstock, making sure that each section has at least one growth bud. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta An easily grown plant, succeeding in most soils[1], though preferring a moisture retentive soil in full sun or partial shade[11, 200]. Plants can be grown in quite coarse grass, which can be cut annually in the autumn[233]. Succeeds in an open woodland garden[200], growing well under trees[20]. Whilst the dormant plant is hardy in much of Britain, the young growth in spring can be damaged by late frosts. A very ornamental plant[1], it often self sows when in a suitable position[200]. Cultivated as a dye plant[50] and on a small scale for its edible young shoots, there is at least one named form. 'White Stem' has white stems and the berries yield a golden-peach dye instead of purple. It is not yet known (1992) if it will breed true from seed[183]. This plant is an alternative host to a number of viral diseases that affect members of the Amaryllidaceae, Liliaceae (broad view, including plants recently [1992] moved into separate fami-

caterpillars of several moth species feed on the foliage of Chickweeds, including *Agrostis venerabilis* (Venerable Dart), *Lobocletia ossularia* (Drab Brown Wave), and *Haematopus grataria* (Chickweed Geometer). Mourning Doves and various sparrows occasionally eat the seeds of Chickweeds, while rabbits and groundhogs eat the foliage [1-6]. Attractive flowers. A good bee plant.

dwatta The common name Stitchwort is a reference to a herbal remedy in which the various stitchwort plant were used - allegedly to cure that pain in the side known as 'stitch', which afflicts many people when they try to run after a long layoff from sporting activities.

nrakta Native to Eurasia but it is widespread around other parts of the temperate world as an introduced species and a common weed. ksacta Agricultural fields, roadsides, trail edges, gravel pits, waste areas. Part shade, sun, sandy or gravelly disturbed soil. In New Zealand in wetlands and margins of water bodies and wet grassland.

propta Seed - broadcast in spring [1-9].

nwatta A rhizomatous perennial herb producing branching stems which are prostrate, sprawling, trailing, or erect. An attractive chickweed. Typical growing conditions are full sun and moist to mesic soil. Grows quite well in loam or clay-loam. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fleshy. Thick or swollen - fibrous or tap root [2-1].

5.2.221 Ligusticum scoticum

Scottish Lovage, Scottish licorice-root, Hulten's licorice-root 4 tin 8 cyuc 3 kcaak 2 tcan 2 dwat 0.6 m hkuc htut cyutli kyuctup hwicli hrasjlutnyik hpa7tli flatprikliw hpa7tmwatli fyfxre7t hjonli

drutta Ligusticum scoticum is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-ferile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Leaves Root Seed StemEdible Uses: CondimentLeaves, flowers and young shoots - raw or cooked[2, 4, 5, 100]. Strong and not very pleasant[115]. Superb in salads[172]. The leaves are usually blanched in order to make the flavour milder[61, 183], though this also reduces the nutritional value[K]. A celery-like flavour, it is used as a seasoning in salads, soups etc[183]. Another report says that the flavour is more like parsley[245]. Stem - used as a flavouring in soups, stews etc[5, 17]. A celery-like flavour[238]. The green stem is peeled and eaten[183]. Root - raw or cooked[2, 5, 161]. A sweet flavour[161]. Seed - ground into a powder and used as a flavouring in soups and stews[172, 238, 245]. A sharp, hot taste it is used in the same ways as pepper[245]. The young shoots and roots are occasionally candied like angelica[183].

tcanta DeodorantScented. Deodorant.

dwatta Aromatic Carminative Deodorant StimulantThe root is aromatic and carminative[4]. It is used in the treatment of hysterical and uterine disorders[4, 238]. The seeds are sweetly aromatic and have been used as a carminative, deodorant and stimulant[4, 172, 238]. They are also sometimes used for flavouring other herbal remedies[4].

nrakta Northwestern Europe, including Britain, from Denmark to Norway. ksacta Rocky coasts in northern Britain[17].

propta Seed - the seed only has a short period of viability and so is best sown as soon as it is ripe in a cold frame in the autumn. Stored seed should be sown as early in the year as possible in a greenhouse or cold frame[200]. Prick out the seedlings into individual pots when they are large enough to handle and plant them out into their permanent positions in the summer if they have grown large enough. Otherwise, keep them in a cold frame for the first winter and plant them out in early summer. Division of the rootstock in early spring. Make sure that each section of root has at least

one growth bud. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Succeeds in any well-drained soil in a sunny position[1, 200]. Dislikes shade. Succeeds in dry soils[238]. Plants are hardy to at least -15°C[238]. Scottish lovage has occasionally been cultivated as a pot herb, though it has been largely supplanted by celery[1, 4, 17]. All parts of the plant are aromatic when bruised, the aroma being likened to a mixture of parsley, angelica and pear skin[245]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

5.2.222 Epilobium latifolium

River Beauty

4 tin 8 cyuc 3 kcaak 1 tcan 2 dwat 0.4 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliw hpa7tmwatli xre7t hjonli

drutta Epilobium latifolium is a PERENNIAL growing to 0.4 m (1ft 4in) by 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in July, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers Leaves StemEdible Uses: TeaYoung shoots - cooked. Used like asparagus[85, 105, 172]. Very poor quality[2]. Young leaves - raw[172, 183]. They become bitter with age[85]. A good source of vitamins A and C[257]. Flower stalks - raw or cooked. Eaten when the flowers are in bud[85]. The dried leaves are used as a tea substitute[85, 177, 183]. The core of mature stems is eaten raw. Slightly sweet, tender and pleasant tasting[85, 172]. Very fiddly though[85].

tcanta Attractive flowers.

dwatta Analgesic Antidote Antiinflammatory Antipruritic Antirheumatic FebrifugeThe entire plant is used in Tibetan medicine, it is said to have a bitter taste and a cooling potency[241]. Analgesic, antidote, anti-inflammatory, antipruritic, antirheumatic and febrifuge, it is used in the treatment of fevers and inflammations, plus also itching pimples[241].

nrakta N. Europe to Northern N. America. ksacta River gravels, margins of streams and damp slopes[43].

propta Seed - sow early spring in situ or as soon as the seed is ripe. Division in spring or autumn. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Prefers a well-drained but moisture retentive soil in a sunny position[200]. Succeeds in most soils[1]. The roots are somewhat spreading and the plant can become invasive[233]. The plant is heat tolerant in zones 7 through 3. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2].

dwatta Carminative Diaphoretic Diuretic Pectoral StimulantWild bergamot was often employed medicinally by several native North American Indian tribes who used it to treat a variety of complaints, but especially those connected with the digestive system[257]. It is still sometimes used in modern herbalism. The leaves and flowering stems are carminative, diaphoretic, diuretic and stimulant[4, 222]. An infusion is used internally in the treatment of colds, catarrh, headaches, gastric disorders, aching kidneys, to reduce low fevers and soothe sore throats[213, 238, 257]. Externally, it is applied as a poultice to skin eruptions, cuts etc and as a wash for sore eyes[238, 257]. The leaves can be harvested before the plant flowers, or they can be harvested with the flowering stems. They can be used fresh or dried[238]. The plant contains the essential oil 'bergamot oil' which can be inhaled to treat bronchial complaints[213]. The leaves also contain 'thymol', an essential oil that can be used to expel gas from the digestive tract[213].

nrakta North-eastern N. America - Quebec to Minnesota, south to Texas. ksacta Dry thickets, clearings and woodland edges[43].

propta Seed - sow mid to late spring in a cold frame. Germination usually takes place within 10 - 40 days at 20°C. When large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in early summer. The seed can also be sown in situ in late summer in areas where the winters are not too severe and will produce larger plants. Cuttings of soft basal shoots in spring. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer. Division in spring or autumn. Very easy, large divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Landscape Uses:Massing. Easily grown in ordinary garden soil so long as it is not too dry[1, 200]. Grows well in heavy clay soils. Requires a moist soil and a sunny position[1, 200], though it also succeeds in light shade[187]. This species thrives when grown in a dry soil[233, 238, 187]. It prefers alkaline soil conditions[238]. Plants are hardy to at least -25°C[187]. A very ornamental plant, there are several named varieties[1, 233]. A good bee plant[200]. Subject to mildew in dry summers[200]. Special Features:Attracts birds, North American native, Attracts butterflies, Suitable for cut flowers, Attractive flowers or blooms. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

5.2.219 Allium angulosum

Mouse Garlic

4 tlin 8 cyuc 3 kcaak 0 tcan 2 dwat 0.5 m hkuc hmimhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Allium angulosum is an evergreen Bulb growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf all year, in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can

grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no individual reports regarding this species have been seen, there have been cases of poisoning caused by the consumption, in large quantities and by some mammals, of certain members of this genus. Dogs seem to be particularly susceptible[76].

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Bulb - raw or cooked[105]. It can be preserved for winter use by salting[2, 177]. The small bulbs are slender and elongated[203] and about 5mm wide[200]. Leaves - raw or cooked. There is a slight bitterness in the flavour[K]. Flowers - raw. Used as a garnish on salads.

tcanta RepellentThe juice of the plant is used as a moth repellent. The whole plant is said to repel insects and moles[20].

dwatta Although no specific mention of medicinal uses has been seen for this species, members of this genus are in general very healthy additions to the diet. They contain sulphur compounds (which give them their onion flavour) and when added to the diet on a regular basis they help reduce blood cholesterol levels, act as a tonic to the digestive system and also tonify the circulatory system[K].

nrakta C. Europe to E. Asia - Siberia. ksacta Damp meadows near rivers[50].

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

nwatta An easily grown plant[203], it prefers a sunny position in a moist but well-drained soil[203]. Succeeds in heavy soils and in light shade[203]. The bulbs should be planted fairly deeply[1]. This species is often sold in nurseries as *A. pyrenaicum*[203]. Closely related to *A. senescens*, differing mainly in having keeled leaves[203]. The flowers do not have the usual onion smell[203]. Cultivated as a vegetable in Siberia[203]. Grows well with most plants, especially roses, carrots, beet and chamomile, but it inhibits the growth of legumes[18, 20, 54]. This plant is a bad companion for alfalfa, each species negatively affecting the other[201]. Members of this genus are rarely if ever troubled by browsing deer[233].

5.2.220 Stellaria graminea

Lesser stitchwort

4 tlin 8 cyuc 3 kcaak 2 tcan 1 dwat 0.5 m hkuc hmimhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Stellaria graminea is a deciduous Perennial growing to 0.5 m (1ft 8in) by 0.2 m (0ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. The flowers are pollinated by Bees, Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. It cannot tolerate atmospheric pollution.

pcista The leaves contain saponins[7, 65]. Although toxic, these substances are very poorly absorbed by the body and so tend to pass through without causing harm. They are also broken down by thorough cooking. Saponins are found in many plants, including several that are often used for food, such as certain beans. It is advisable not to eat large quantities of food that contain saponins. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K]. Report of paralysis attributed to excessive intake. Should not be used during pregnancy or during breastfeeding [301].

kcakta Leaves and shoots used in salads or lightly cooked as a vegetable. Harvest young shoot in spring to summer [1-9].

tcanta Faunal Associations: The nectar and pollen of the flowers attract small bees and flies primarily. The

lies) and Solanaceae[200]. Plants seem to be immune to the predations of rabbits[233]. The plant is heat tolerant in zones 9 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2].

5.2.194 Aralia racemosa

American Spikenard

4 tlin 8 cyuc 3 kcaak 2 tcan 3 dwat 1.8 m hkuc pcimhmim cyutli tcup hwicli hrasljutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Aralia racemosa is a PERENNIAL growing to 1.8 m (6ft) by 1.2 m (4ft in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: Fruit Leaves RootEdible Uses: CondimentYoung shoot tips - cooked[161]. Used as a potherb[207] or as a flavouring in soups[257]. Root - cooked. Large and spicy, it is used in soups[43, 105, 161, 177]. Pleasantly aromatic, imparting a liquorice-like flavour[183]. A substitute for sarsaparilla (*Smilax spp.*) [200], it is also used in making 'root beer'[183]. Fruit - raw or cooked[207]. Pleasant and wholesome to eat[207]. They can be made into a jelly[183, 207]. The fruit is about 4mm in diameter[200]. The roots have an aroma. The fruit are purple-brown [1-4].

tcanta A specialist nectary plant [1-2]. dwatta Alterative Antirheumatic Diaphoretic Eczema Expectorant Poultice Skin StimulantAmerican spikenard is a sweet pungent tonic herb that is often used in modern herbalism where it acts as an alterative[238]. It had a wide range of traditional uses amongst the North American Indians and was at one time widely used as a substitute for the tropical medicinal herb sarsaparilla[222, 257]. The root is alterative, diaphoretic, diuretic, pectoral and stimulant[4, 21, 46, 222]. The herb encourages sweating, is stimulating and detoxifying and so is used internally in the treatment of pulmonary diseases, asthma, rheumatism etc[4, 213, 238, 254]. Externally it is used as a poultice in treating rheumatism and skin problems such as eczema[4, 213, 238, 254]. The root is collected in late summer and the autumn and dried for later use[4, 213]. A drink made from the pulverised roots is used as a cough treatment[213]. A poultice made from the roots and/or the fruit is applied to sores, burns, itchy skin, ulcers, swellings etc[213, 222].

nrakta Eastern N. America - Quebec to Georgia, west to Kansas and Minnesota. ksacta Rich woodlands and thickets[21, 43].

propta Seed - best sown as soon as ripe in a cold frame. Stored seed requires 3 - 5 months of cold stratification. Germination usually takes place within 1 - 4 months at 20°C[134]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in a greenhouse for at least their first winter. Once the plants are 25cm or more tall, they can be planted out into their permanent positions, late spring or early summer being the best time to do this. Root cuttings 8cm long, December in a cold frame[11, 78]. Store the roots upside down in sand and pot up in March/April. High percentage[78]. Division of suckers in late winter[11]. Very easy, the suckers can be planted out direct into their permanent positions if required.

nwatta An easily grown plant, succeeding in sun or part shade in any fertile soil[233]. Prefers a good deep loam and a semi-shady position[1, 111, 134]. Requires a sheltered position[1]. Plants are harder when grown in poorer soils[200].

The young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. Grows well by water[111]. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multi-stemmed with multiple stems from the crown [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

5.2.195 Angelica sylvestris

Wild Angelica, Woodland angelica

4 tlin 8 cyuc 3 kcaak 0 tcan 2 dwat 1.5 m hkuc pcimhmimhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatpriklwis hpa7tmwatli fyifkre7t hjonli

drutta Angelica sylvestris is a BIENNIAL growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All members of this genus contain furocoumarins, which increase skin sensitivity to sunlight and may cause dermatitis[238].

kcakta Edible Parts: Leaves Root SeedEdible Uses: CondimentLeaves, young shoots and stems - used as an aromatic addition to salads[7], or cooked and used as a vegetable[2, 5, 8, 13, 183]. The taste is somewhat bitter[5]. The chopped leaves are a good addition to cooked acid fruits, especially rhubarb[183]. The stem and leafstalks are used in candies and sweetmeats[2, 46, 105, 183]. Seed - used as an aromatic flavouring in confections and pastries[2, 7]. Root - cooked[2].

tcanta Dye ParasiticideThe pulverized fruits are used to kill head parasites[46, 61]. A good yellow dye is obtained from the plant (the report does not specify which part of the plant)[4].

dwatta Antispasmodic Carminative Diaphoretic Diuretic Expectorant Parasiticide Stimulant Stomachic TonicThe root and the seeds are antispasmodic, aromatic, carminative, diaphoretic, diuretic, emmenagogue, expectorant, stimulant, stomachic, and tonic[7, 13, 21, 147, 218]. This plant is less rich in active principles than *A. archangelica* and so is much less used medicinally than that species[9, 244], but a decoction is sometimes used in the treatment of bronchial catarrh, coughs and dyspepsia[9]. Large doses have the effect of depressing the central nervous system[7].

nrakta Most of Europe, including Britain, to W. Asia and Siberia. ksacta Moist fields and hedgerows, open woods, marshes and fens, not usually found on acid soils[7, 13].

propta Seed - best sown in a cold frame as soon as it is ripe since the seed only has a short viability[200]. Seed can also be sown in the spring, though germination rates will be lower. It requires light for germination[200]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter, planting them out into their permanent positions in the spring. The seed can also be sown in situ as soon as it is ripe.

nwatta Requires a deep moist fertile soil in dappled shade or full sun[200]. Succeeds in deep shade. Plants are reliably perennial if they are prevented from setting seed[200].

5.2.196 Chaenomeles x californica

California Quince

4 tin 8 cyuc 3 kcaak 2 tcan 1 dwat 1.8 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli hjonli

drutta Chaenomeles x californica is a deciduous Shrub growing to 1.8 m (6ft) by 1.8 m (6ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. The flowers are pollinated by Bees, Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. It can tolerate atmospheric pollution.

kcakta Fruit - very harsh and acid raw but fragrant when cooked. Used for jams, jellies etc and as a flavouring with cooked apples[K]. The fruit can be apple or pear-shaped and up to 6cm long x 6cm wide[200]. The flesh is firm, fragrant and acidic.

tcanta Plants can be grown to make a medium sized hedge[200]. Attractive flowers. Landscape Uses: Border, Erosion control, Ground cover, Massing, Woodland garden. Some cultivars of Chaenomeles x superba such as ‘Crimson and Gold’ produce suckers prolifically and are suitable for ground cover[182]. This may not be present in the hybrid.

dwatta Possibly some medical uses. C. x californica is a tri-species hybrid (C. x superba x C. cathayensis). Chaenomeles cathayensis fruits is antiemetic, antirheumatic, antispasmodic and digestive[176]. It is used in the treatment of rheumatic pain, convulsions of the calf muscles, vomiting, dyspepsia and diarrhoea[176]. No medical uses are known for Chaenomeles x superba.

nrakta Hybrid ksacta Garden Hybrid

propta Seed - best sown as soon as it is ripe in a sheltered position outdoors or in a cold frame[200]. Sow stored seed in February in a greenhouse[78]. Germination usually takes place within 6 weeks[78]. Prick out the seedlings into individual pots as soon as they are large enough to handle. If well grown, these seedling can be large enough to plant out in the summer, but give them some protection in their first winter. Otherwise plant them out in late spring of the following year[K]. This species is a hybrid and so will not breed true from seed. Cuttings of half-ripe wood, July/August in a frame[11]. Easy[113]. Cuttings of mature wood of the current year’s growth, November in a cold frame. Layering in late spring or in autumn. This is a sure and easy method, though it takes 12 months[78, 200].

nwatta The hybrid C. x californica is a tri-species hybrid (C. x superba x C. cathayensis). Named cultivars are available in the horticultural trade. Chaenomeles x californica is a strong growing quince with an upright crown reaching 1.8m high and wide. ‘Enchantress’ is a compact shrub single white to pink flowers and large yellow edible fruits. ‘?Masterpiece’ has large ovate fruit and pink-red flowers. Easily cultivated in any reasonably good soil[1, 200]. Prefers a deep moist well-drained loam[4, 11]. Grows well in heavy clay soils. Tolerates full shade but requires a sunny position for best fruit production[3, 11, 200]. Becomes chlorotic on very alkaline soils[188, 200]. Tolerates atmospheric pollution[200]. A very ornamental plant[1], it is hardy to about -25c[200]. Plants are subject to canker, especially when growing in the milder moister areas of Britain[49]. Plants in this genus are notably resistant to honey fungus[200]. Fruits are usually freely produced in Britain, but they do not always ripen[11, 182]. A good bee plant, flowering early in the year and providing pollen and nectar[108]. Landscape Uses: Border, Erosion control, Ground cover, Massing, Woodland garden. Special Features: Not North American native, Attractive flowers or blooms. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

5.2.197 Crambe tatarica

Tartar Bread Plant

4 tin 8 cyuc 3 kcaak 2 tcan 0 dwat 1 m hkuc

hmimhtut cyutli tcup hwicli hyishrasjlutnyik hpa7tli prikliwisslip hpa7tmwatli xre7t hjonli

drutta Crambe tatarica is a PERENNIAL growing to 1 m (3ft 3in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves RootEdible Uses: Leaves and young stems- raw or cooked[2, 46, 74]. Usually blanched in much the same way as seekale (C. maritima)[61, 183]. Root - raw or cooked[105]. The root, which can be as thick as a person’s arm, is fleshy and sweet[2, 183]. It can be used raw in salads, or be cooked as a vegetable[2]. It can be dried and ground into a powder, then mixed with cereal flours when making bread[2]. The root is rich in starch and sugars[74].

tcanta Attracts wildlife.

nrakta E. Europe to W. Asia. ksacta Bushy and grassy places[45], it is also found on chalky slopes[74].

propta Seed - sow March/April in a seedbed outdoors and either thin the plants out or move them to their permanent positions when about 10cm tall[111]. The young plants are very attractive to slugs so some protection will often be needed. Germination can be slow so it is best to sow the seed in pots in a cold frame[164]. Germination usually takes place in 3 - 26 weeks at 15°c[164]. Prick out the seedlings into individual pots as soon as they are large enough to handle and plant out into their permanent positions when they are at least 10cm tall. Division in spring or autumn[1, 111]. Dig up the root clump and cut off as many sections as you require, making sure they all have at least one growing point. The larger of these divisions can be planted out straight into their permanent positions, though small ones are best potted up and grown on in a cold frame until they are established. Root cuttings, 3 - 10 cm long, in spring[104]. These can be planted straight into the open ground or you can pot them up in the greenhouse and plant them out once they are growing strongly.

nwatta An easily grown plant, succeeding in a good loam and an open sunny position[1]. Prefers a slightly alkaline soil in a position sheltered from strong winds[200]. Tolerates poor soil and some shade[200]. Dislikes acid soils[1]. A deep-rooted plant[233], it dislikes root disturbance[164]. This is an aggregate species[54]. There is some confusion over the correct spelling of this species name, it is written as C. tatarica in some books[50]. Plants can be grown in the summer meadow if the grass is not cut too low (since this would damage the growing point)[200]. A good bee plant[74].

5.2.198 Amelanchier humilis

Low serviceberry

4 tin 8 cyuc 3 kcaak 0 tcan 0 dwat 1.8 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta Amelanchier humilis is a deciduous Shrub growing to 1.8 m (6ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in April, and the seeds ripen from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Edible fruit - raw or cooked[105, 159, 177]. Sweet[43]. A very pleasant flavour, the fruit is juicy with a hint of apple in the taste and contains a few small seeds at the centre[K]. The fruit is rich in iron and copper[226].

nrakta Eastern N. America - Vermont to Alberta and south to New York and Iowa. ksacta Rocky or sandy shores and banks, often calcareous[43].

propta Seed - it is best harvested ‘green’, when the seed is fully formed but before the seed coat has hardened, and then sown immediately in pots outdoors or in a cold frame.

root just below the soil level. The original root will regrow and you will have a number of root tops, each of which will make a new plant. These can either be potted up or planted out straight into their permanent positions.

nwatta Tolerates moist soils and situations but prefers a moist soil and some shade[1, 4]. Grows well in heavy clay soils. Best grown in an open sunny site in a deep rich soil if it is being grown for compost material[200]. Plants can be invasive, often spreading freely by means of self-sown seed. They are also very difficult to remove, the root system is very deep and even small fragments of root left in the soil can produce new plants.

5.2.216 Berberis canadensis

Allegheny Barberry, American barberry

4 tin 8 cyuc 3 kcaak 1 tcan 2 dwat 1.8 m hkuc

hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta Berberis canadensis is a deciduous Shrub growing to 1.8 m (6ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Flowers Fruit LeavesEdible Uses: Fruit - raw or cooked. Agreeably acid[2, 22, 46, 95, 161], they are an acceptable raw fruit in small quantities but are more commonly used in preserves[177, K]. The fruits are about 9mm long[200]. Leaves - raw. A trailside nibble[102]. Flowers[102]. No more details.

tcanta DyeA yellow dye is obtained from the root.

dwatta Antibacterial Cancer DysenteryBerberine, universally present in rhizomes of Berberis species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Licorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218]. A tea made from the roots is used in the treatment of fevers and diarrhoea[222].

nrakta Eastern N. America - Virginia to Georgia, Alberta and Indiana. ksacta Banks of streams and dry woods[11, 43]. In woods or glades, on rocky slopes and near rivers at elevations of 100 - 700 metres[270].

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season’s growth, preferably with a heel, October/November in a frame[78].

nwatta Prefers a warm moist loamy soil but is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. Succeeds in full sun or light shade[11, 200]. The plant is an alternate host of ‘black stem rust’ of cereals and so it is often grubbed out when growing wild in cereal-producing areas. Hybridizes freely with other members of this genus[1]. Plants can be pruned back quite severely and resprout well from the base[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2].

5.2.217 Silphium integrifolium

Prairie Rosinweed

4 tin 8 cyuc 3 kcaak 2 tcan 1 dwat 1.8 m hkuc

htut cyutli hgatkyuctcup hwicli hyishrasjlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli hjonli

drutta Silphium integrifolium is a PERENNIAL growing to 1.8 m (6ft) by 0.9 m (3ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: OilEdible Uses: OilCarbon Farming Solutions - Staple Crop: protein-oil (The term staple crop typically refers to a food that is eaten routinely and accounts for a dominant part of people’s diets in a particular region of the world) [1-1]. Under development at the Land Institute to domesticate this species for use as an oilseed crop. Trials yielded 1.1t/ha of seed [1-1].

tcanta OilGarden Ornamental. Compared to other Silphium species, it is shorter, less likely to topple over, and faster from seed to flower. More manageable than most perennial sunflowers as it spreads slowly, and it is not known to be allelopathic. Adapts well to prairies, wildflower/native plant gardens, naturalized areas, meadows or moist, open woodland areas. Attracts birds and butterflies

dwatta Native American peoples used the roots to treat pain from injuries [4].

nrakta Native to eastern North America, including Ontario in Canada and the eastern and central United States as far west as New Mexico. ksacta Mesic to dry black soil prairies, gravel prairies, clay prairies, hill prairies, openings in rocky upland forests, limestone glades, and areas along railroads, particularly where prairie remnants occur. This plant can survive significant degradation, and recovers readily from occasional wildfires. It competes well against most prairie grasses and forbs in mesic to dry areas.

propta Seed. Plants may be slow to establish in the garden, particularly when grown from seed. Plants often self-seed in optimum growing conditions. Plants develop tap-roots. Once established, division is not recommended.

nwatta Management: Standard Staple Crop: Protein-oil Under DevelopmentClimate: boreal to warm temperate. Humidity: semi-arid to humid. It needs full sun, poor to loamy soils, and mesic to dry conditions. Average, medium moisture, well-drained soils. Tolerates some light shade. Also tolerates some drought once established. Will grow in a variety of soils including sandy, loamy or clay ones. Cultivation: under development. Management: standard (Describes the non-destructive management systems that are used in cultivation) [1-1].

5.2.218 Monarda fistulosa

Wild Bergamot, Mintleaf bergamot, Wild Bee-Balm, Lupine

4 tin 10 cyuc 3 kcaak 2 tcan 2 dwat 1.5 m hkuc

htut cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta Monarda fistulosa is a PERENNIAL growing to 1.5 m (5ft) by 0.5 m (1ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in July, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: Flowers LeavesEdible Uses: Condiment TeaLeaves - raw or cooked. The entire plant above ground level can be used as a potherb[183], though it is rather aromatic. It is also used as a flavouring in salads and cooked foods[46, 105, 183, 213]. The flowers make an attractive edible garnish in salads[183]. The fresh or dried leaves are brewed into a refreshing aromatic tea[183, 257].

tcanta RepellentThe leaves have been used as an insect repellent[257].

The plant is abortifacient, analgesic, antirheumatic, antitumor, diaphoretic, diuretic, emmenagogue, febrifuge and peccoral[257].

nrakta Eastern N. America - Newfoundland to Western Virginia, Manitoba, Kentucky and Iowa. ksacta An understory shrub in rich forests (deciduous, mixed, or coniferous), bogs, swamps, gorges, ravine slopes, and rocky banks from sea level to 1500 metres[270].

propta Seed - can be very slow to germinate, often taking 2 or more years[78, 80]. It is best sown as soon as it is ripe in the autumn when it should germinate 18 months later. Stored seed may take 2 years or more to germinate. 4 months warm followed by 4 months cold stratification may help reduce the germination time[113]. Harvesting the seed 'green' (when fully developed but before it has dried on the plant) and then sowing it immediately has not been found to reduce the germination time because the inhibiting factors develop too early[80]. Prick out the seedlings into individual pots once they are large enough to handle and grow them on in pots in a cold frame. The seedlings are very slow-growing and will probably require at least 2 years of pot cultivation before being large enough to plant out. Any planting out is best done in late spring or early summer, after the last expected frosts[K]. Cuttings of half-ripe terminal shoots, 5 - 8cm long, July/August in a shaded frame. Should root by late September but leave them in the frame over winter and plant out in late spring[78]. High percentage[11]. Cuttings of ripe terminal shoots, taken in winter after a hard frost, in a shaded frame[113].

nwatta Thrives in almost any soil, acid or alkaline, as long as it is well-drained[200]. Plants are very shade tolerant[82]. This species is the most cold-hardy member of the genus[11] - dormant plants will tolerate very heavy frosts though the young growth in spring can be damaged by a few degrees of frost. The plants produce very little fibrous root and should be planted in their final positions when still small[81]. Plants in this genus are notably resistant to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required. Other reports say that this species usually has monoecious flowers (separate male and female flowers, but both borne on the same plant)[82, 270].

5.2.214 *Cryptotaenia canadensis*

Honewort, Canadian honewort

4 tlin 8 cyuc 3 kcaak 0 tcan 0 dwat 1 m hkuc hmim cyutli tcup hwicli hrasjltunyk hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta *Cryptotaenia canadensis* is a PERENNIAL growing to 1 m (3ft 3in) by 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: Flowers Leaves Root StemEdible Uses: Young leaves, stems and flowers - raw or cooked[105, 177]. Used as a potherb or added to salads[183]. A flavour that is somewhat like celery[238], if you use your imagination[K]. Root - cooked[177, 183]. The seeds are used as a flavouring for cakes, breads and biscuits[183].

nrakta Eastern N. America - Western New Brunswick to Manitoba and south to Alabama. Arkansas and Texas. ksacta Rich woods and thickets[43]. Woodland ravines and riverbanks[238].

propta Seed - sow April in a greenhouse. Germination is usually rapid, prick out the seedlings into individual pots when they are large enough to handle and plant them out in early summer. The ideal temperature for sowing is about 25°C, though seed does germinate at higher and lower temperatures[206]. Seed can also be sown in early autumn[206]. Division in spring or autumn.

nwatta Succeeds in a rich moist soil, preferring to grow in dappled shade[200, 238]. Closely related to *C. japonica*, a species that is cultivated as a vegetable in Japan[43, K]. This species is being cultivated in America to supply the Japanese market with a chervil-like herb[218]. Slugs are extremely fond of this plant, especially when the new growth emerges in spring[K]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above)

information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

5.2.215 *Symphytum asperum*

Prickly Comfrey

4 tlin 8 cyuc 3 kcaak 0 tcan 2 dwat 1.5 m hkuc hmimhtut cyutli tcup hwicli hrasjltunyk hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Symphytum asperum* is a PERENNIAL growing to 1.5 m (5ft) by 0.6 m (2ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to June, and the seeds ripen from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista No reports of toxicity have been seen for this species, but the following reports have been seen for *S. officinale*. This plant contains small quantities of a toxic alkaloid which can have a cumulative effect upon the liver. Largest concentrations are found in the roots, leaves contain higher quantities of the alkaloid as they grow older and young leaves contain almost none. Most people would have to consume very large quantities of the plant in order to do any harm, though anyone with liver problems should obviously be more cautious. In general, the health-promoting properties of the plant probably far outweigh any possible disbenefits, especially if only the younger leaves are used.

kcakta Edible Parts: LeavesEdible Uses: Gum TeaThe following reports are for *S. officinale*, they are said to also apply to this species[200]. Young leaves - cooked or raw[2, 4, 5, 9, 46, 61]. The leaf is hairy and the texture is mucilaginous. It may be full of minerals but it is not pleasant eating for most tastes. It can be chopped up finely and added to salads, in this way the hairiness is not so obvious[183]. Young shoots can be used as an asparagus substitute[46]. The blanched stalks are used[183]. Older leaves can be dried and used as a tea[26]. The peeled roots are cut up and added to soups[183]. A tea is made from the dried leaves and roots[183]. The roasted roots are used with dandelion and chicory roots for making coffee[183].

tcanta Biomass Compost GumThe following reports are for *S. officinale*, they are said to also apply to this species[200]. The plant grows very quickly, producing a lot of bulk. It is tolerant of being cut several times a year and can be used to provide 'instant compost' for crops such as potatoes. Simply layer the wilted leaves at the bottom of the potato trench or apply them as a mulch in no-dig gardens. A liquid feed can be obtained by soaking the leaves in a small amount of water for a week, excellent for potassium demanding crops such as tomatoes. The leaves are also a very valuable addition to the compost heap[26, 200]. A gum obtained from the roots was at one time used in the treatment of wool before it was spun[100].

dwatta Anodyne Astringent Demulcent Emollient Expectorant Haemostatic Refrigerant VulneraryThe leaves are anodyne, mildly astringent, demulcent, emollient, expectorant, haemostatic, refrigerant and vulnerary. They are used as an external poultice in the treatment of cuts, bruises and sprains. Internally, they are used as a tea in the treatment of chest complaints. The plant contains a substance called 'allantoin', a cell proliferant that speeds up the healing process[4, 21, 26, 165]. The leaves are harvested in the summer and can be used fresh or dried.

nrakta Europe to W. Asia. Occasionally naturalized in Britain. ksacta Waste places in Britain[17].

propta Seed - sow spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. If you have sufficient seed you can try an outdoor sowing in situ in the spring. Division succeeds at almost any time of the year. Simply use a spade to chop off the top 7cm of

If stored seed is obtained early enough in the autumn, it can be given 4 weeks warm stratification before being left out in the winter and it should then germinate in the spring. Otherwise seed can be very slow to germinate, perhaps taking 18 months or more. When large enough to handle, prick the seedlings out into individual pots and grow them on in a sheltered outdoor position, planting them out once they are 20cm or more tall. If there is sufficient seed it is best to sow it thinly in an outdoor seedbed[78, 80]. Grow the seedlings on for two years in the seedbed before planting them out into their permanent positions during the winter. Layering in spring - takes 18 months[78]. Division of suckers in late winter. The suckers need to have been growing for 2 years before you dig them up, otherwise they will not have formed roots. They can be planted out straight into their permanent positions if required.

nwatta Prefers a rich loamy soil in a sunny position or semi-shade[1, 200] but thrives in any soil that is not too dry or water-logged[11]. Grows well in heavy clay soils. Plants are often found growing on calcareous soils in the wild[43]. Hardy to about -25°C[184]. All members of this genus have edible fruits and, whilst this is dry and uninteresting in some species, in many others it is sweet and juicy. Many of the species have potential for use in the garden as edible ornamentals. The main draw-back to this genus is that birds adore the fruit and will often completely strip a tree before it is fully ripe[K]. This species produces suckers freely, forming thickets[184]. Closely related to *A. stolonifera*[11, 200]. Hybridizes with *A. stolonifera*, *A. arborea* and *A. bartramiana*. Grafting onto seedlings of *A. lamarckii* or *Sorbus aucuparia* is sometimes practised in order to avoid the potential problem of hybridizing[1].

5.2.199 *Berberis cooperi*

4 tlin 8 cyuc 3 kcaak 1 tcan 2 dwat 1.5 m hkuc hmimhtut cyutli tcup hwicli hyishrasjltunyk hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta *Berberis cooperi* is a deciduous Shrub growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. An acid taste, but it is pleasant raw in small quantities[K].

tcanta DyeA yellow dye is obtained from the root. dwatta Antibacterial Cancer DysenteryBerberine, universally present in rhizomes of *Berberis* species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with *Glycyrrhiza* species (Licorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumor activity[218].

nrakta E. Asia - Bhutan ksacta Not known propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78].

nwatta Prefers a warm moist loamy soil and light shade but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. Hybridizes freely with other members of this genus[1]. Plants

can be pruned back quite severely and resprout well from the base[200].

5.2.200 *Heracleum sphondylium*

Cow Parsnip, Eltrot

4 tlin 8 cyuc 3 kcaak 2 tcan 2 dwat 1.8 m hkuc pcmhmmhtut cyutli tcup hwicli hrasjltunyk hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta *Heracleum sphondylium* is a BIENNIAL/PERENNIAL growing to 1.8 m (6ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to September, and the seeds ripen from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Many members of this genus, including many of the sub-species in this species[65], contain furanocoumarins. These have carcinogenic, mutagenic and phototoxic properties. See below for more details.

kcakta Edible Parts: Leaves Root StemEdible Uses: SweetenerStem and young shoots - raw or cooked[5, 7, 9, 17]. Used as a green vegetable, when harvested just as they are sprouting from the ground they are somewhat like asparagus in flavour[183]. The rind is somewhat acrid[115]. The leaf stems are tied in bundles and dried in the sun until they turn yellow[238]. A sweet substance resembling sugar forms on the dried stems and is considered to be a great delicacy[2, 115, 183, 238]. The peduncles, before flowering, can be eaten as a vegetable or added to soups[183]. Root - cooked. It is usually boiled[7].

dwatta Antidiarrhoeal Antisporiatic Aphrodisiac Digestive Expectorant SedativeThe roots and the leaves are aphrodisiac, digestive, mildly expectorant and sedative[7, 9, 238]. The plant is little used in modern herbalism but has been employed in the treatment of laryngitis and bronchitis[9, 238]. A tincture made from the aerial parts of the plant has also been used to relieve general debility, though it is uncertain how it works[7, 238]. The plant is harvested as it comes into flower and can be dried for later use[9].

nrakta Europe, including Britain, south of latitude 61° to western N. Africa, west and northern Asia. ksacta Moist grassland and ditches, by hedges and in woods[7, 17].

propta Seed - sow mid to late spring or early autumn in situ. Division in autumn.

nwatta A very easily grown plant, succeeding in any ordinary garden soil[1, 238], doing best in moist soils or deep woodland[1]. Grows well in full sun or partial shade[238]. This species contains a large number of sub-species. Some, but by no means all of them, can cause various problems as detailed at the top of this record. Subspecies *transylvanicum*, *pyrenaicum*, *montanum*, *orsinii* and *alpinum* are distinctly phototoxic, subspecies *sphondylium* and *sibiricum* are not phototoxic whilst subspecies *granatense* and *ternatum* vary in their toxicity[65]. A good bee plant[108]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

5.2.201 *Rubus spectabilis*

Salmonberry

4 tlin 8 cyuc 3 kcaak 3 tcan 2 dwat 1.8 m hkuc hmimhtut cyutli tcup hwicli hrasjltunyk hpa7tli frusflatprikliwis hpa7tmwatli xre7t hjonli

drutta *Rubus spectabilis* is a deciduous Shrub growing to 1.8 m (6ft) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in April, and the seeds ripen from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers

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

kcakta Edible Parts: Flowers Fruit Stem**Edible Uses:** TeaFruit - raw, cooked or dried for later use[1, 2, 17, 85, 101, 183]. Juicy with a very good flavour[182, 183]. The fruit can be made into jams and jellies[257]. This species is not of much value in Britain, it does not fruit freely in the cooler summers of this country and the fruits do not always develop their full flavour[11]. The fruit can range in colour from yellow, through orange to red, it is about the size of a cultivated raspberry but is rather inferior in flavour and often has a distinctive bitterness, especially in cooler summers[K]. Another report says that it fruits freely in Britain[182]. Young shoots-peeled and eaten raw or cooked like asparagus[11, 101, 118, 183, 257]. They are harvested in the spring as they grow above the soil and whilst they are still tender[161]. Flowers - raw[172]. The leaves are used as a tea substitute[183].

tcanta Disinfectant Dye PipesAgroforestry Uses: The deep root system of salmonberry can help prevent soil erosion on steep slopes[1050] Salmonberry is a pioneer or early seral species noted for its ability to spread aggressively on disturbed sites. A certain amount of soil disturbance is essential for good seedling establishment. Seedlings generally appear in abundance after fire, timber harvest, or other types of disturbance. Rhizomes enable the plant to spread vigorously and form dense patches. In many areas dense stands may form within 2 to 3 years after disturbance[1050]. The stands will often diminish as tree species become established and form a canopy, though it can persist almost indefinitely, especially under hardwood canopies such as Alder. Other Uses: The plant is used in breeding programmes with the raspberry (*Rubus idaeus*) in North America[317]. A purple to dull blue dye is obtained from the fruit[168]. The hollowed stems are used as pipes[99]. (The report does not specify what type of pipes).

dwatta Analgesic Astringent Disinfectant Odontalgic Poultice StomachicThe leaves and the root are astringent[172]. A poultice of the chewed leaves has been used as a dressing on burns[257]. The root bark is analgesic, astringent, disinfectant and stomachic[257]. A decoction is used in the treatment of stomach complaints[257]. A decoction has been used to lessen the pains of labour[257]. The powdered bark has been used as a dusting powder on burns and sores[257]. A poultice of the bark has been applied to wounds and aching teeth to ease the pain[257]. A poultice of the chewed bark has been used as a dressing to relieve pain and clean burns and wounds[257].

nrakta Western N. America - Alaska to California. Occasionally naturalized in Britain[17]. **ksakta Moist spots** in and about woods below 300 metres in California[71].

propta Seed - requires stratification and is best sown in early autumn in a cold frame. Stored seed requires one month stratification at about 3°C and is best sown as early as possible in the year. Prick out the seedlings when they are large enough to handle and grow on in a cold frame. Plant them out into their permanent positions in late spring of the following year. Cuttings of half-ripe wood, July/August in a frame[200]. Tip layering in July. Plant out in autumn. Division in early spring or just before leaf-fall in the autumn[200].

nwatta Easily grown in a good well-drained loamy soil in sun or semi-shade[1, 11, 200]. Grows well in the shade of trees[200] though it is less likely to fruit well in such a position[K]. Hardy to about -25°C[184]. A very ornamental plant, but it is invasive[1]. It does not fruit well in Britain[11], but has become naturalized in Surrey and Cumbria in cool acid woodland soils[182]. This species is a raspberry with biennial stems, it produces a number of new stems each year from the perennial rootstock, these stems fruit in their second year and then die[200]. Plants in this genus are notably susceptible to honey fungus[200]. The plant is heat tolerant in zones 8 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-

ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A clumping plant, forming a colony from shoots away from the crown but with a limited spread [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

5.2.202 Symphytum uplandicum

Comfrey

4 tlin 8 cyuc 3 kcak 4 tcan 5 dwat 1.2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrp hpa7tli flatprikwiwis hpa7tmwatli xre7t hjonli

drutta Symphytum uplandicum is a PERENNIAL growing to 1.2 m (4ft) by 0.6 m (2ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista This plant contains small quantities of a toxic alkaloid which can have a cumulative effect upon the liver. Largest concentrations are found in the roots, leaves contain higher quantities of the alkaloid as they grow older and young leaves contain almost none. Most people would have to consume very large quantities of the plant in order to do any harm, though anyone with liver problems should obviously be more cautious. In general, the health-promoting properties of the plant probably far outweigh any possible disbenefits, especially if only the younger leaves are used.

kcakta Edible Parts: Leaves**Edible Uses:** Gum TeaYoung leaves - cooked or raw[2, 4, 5, 9, 46, 61]. The leaf is hairy and the texture is mucilaginous. It may be full of minerals but it is not pleasant eating for most tastes. It can be chopped up finely and added to salads, in this way the hairiness is not so obvious[183]. Young shoots can be used as an asparagus substitute[46]. The blanched stalks are used[183]. Older leaves can be dried and used as a tea[26]. The peeled roots are cut up and added to soups[183]. A tea is made from the dried leaves and roots[183]. The roasted roots are used with dandelion and chicory roots for making coffee[183].

tcanta Biomass Compost GumThe plant grows very quickly, producing a lot of bulk. It is tolerant of being cut several times a year and can be used to provide 'instant compost' for crops such as potatoes. Simply layer the wilted leaves at the bottom of the potato trench or apply them as a mulch in no-dig gardens. A liquid feed can be obtained by soaking the leaves in a small amount of water for a week, excellent for potassium demanding crops such as tomatoes. The leaves are also a very valuable addition to the compost heap[26, 200]. A gum obtained from the roots was at one time used in the treatment of wool before it was spun[100]. Plants can be grown as a ground cover when planted about 1.2 metres apart each way[208]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Anodyne Astringent Demulcent Eczema Emollient Expectorant Haemostatic Refrigerant VulneraryComfrey is a commonly used herbal medicine with a long and proven history in the treatment of various complaints. The root and the leaves are used, the root being more active, and they can be taken internally or used externally as a poultice[4, 222]. Comfrey is especially useful in the external treatment of cuts, bruises, sprains, sores, eczema, varicose veins, broken bones etc, internally it is used in the treatment of a wide range of pulmonary complaints, internal bleeding etc[4, 238, K]. The plant contains a substance called 'allantoin', a cell proliferant that speeds up the healing process[4, 21, 26, 165, 222, 238]. This substance is now synthesized in the pharmaceutical industry and used in healing creams[238]. The root and leaves are anodyne, astringent (mild), demulcent, emollient, expectorant, haemostatic, refrigerant, vulnerary[4, 21, 26, 165, 222]. Some caution is advised, however, especially in the internal use of the herb. External applications and internally taken teas or tinctures of the leaves are considered to be completely safe, but internal applications of tablets or capsules are felt to have too many drawbacks for safe usage[238]. See also the notes above on

to eat[238]. The Council of Europe list *Inula helenium* as a natural food flavouring.

tcanta Dye EssentialA blue dye is obtained from the bruised and macerated root mixed with ashes and whortleberries (*Vaccinium myrtillus*)[4, 46, 61]. The root yields up to 2% of a camphor-scented essential oil, this is used as a flavouring and medicinally[46, 61, 238].

dwatta Alternative Anthelmintic Antiseptic Antitussive Astringent Bitter Cholagogue Demulcent Diaphoretic Diuretic Expectorant Stimulant Stomachic TonicElecampane has a long history of use as a medicinal herb. A gently warming and tonic herb, it is especially effective in treating coughs, consumption, bronchitis and many other complaints of the chest as well as disorders of the digestive system[4, 9, 254]. A very safe herb to use, it is suitable for the old and the young and especially useful when the patient is debilitated[254]. It cleanses toxins from the body, stimulating the immune and digestive systems and treating bacterial and fungal infections[238]. The root is alterative, anthelmintic, antiseptic, astringent, bitter, cholagogue, demulcent, diaphoretic, diuretic, mildly expectorant, gently stimulant, stomachic, tonic[4, 7, 9, 21, 46, 165, 200, 218, 222]. It is best harvested in the autumn from plants that are two years old, and it can be dried for later use[4]. The roots should be at least 3 years old according to another report[7]. This remedy should not be prescribed for pregnant women[238]. An extract of the plant is a powerful antiseptic and bactericide, particularly effective against the organism that causes TB[213, 238]. The root contains alantolactone, which is strongly anthelmintic. In a 1:1000 dilution it kills the parasitic worm *Ascaris* in 16 hours[218]. Alantolactone has an anti-inflammatory action, it also reduces mucous secretions and stimulates the immune system[254]. The plant is sometimes recommended as an external wash for skin inflammations and varicose ulcers, but has been known to cause allergic reactions[238].

nrakta S.E. Europe. Naturalized in Britain. **ksakta** Fields, waysides, waste places, copses etc[17], often on moist soils in shade[4].

propta Seed - sow in spring or autumn in a cold frame[4]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. If you have sufficient seed, it could be worthwhile trying an outdoor sowing in situ in the spring. Division in spring or autumn[111]. Fairly small pieces of root can be used, so long as each piece has a growth bud on it[4]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring. Root cuttings in winter. Cut sections of root about 5cm long, place them in a warm greenhouse over the winter and they should grow away vigorously[4].

nwatta An easily grown plant, it grows well in moist shady positions in ordinary garden soil, though it grows best in a good loamy soil[4]. Succeeds in an ordinary garden soil in a sunny position[1]. Plants are also tolerant of considerable neglect, succeeding on our Cornwall trial ground even when left unweeded for four years[K]. Elecampane has a long history of cultivation as a medicinal herb, though it is not commonly grown nowadays[4]. When first dug up, the roots smell like ripe bananas, but as they dry they take on the scent of violets[245]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is clumping, giving the plant a clumping habit. The predictable growth behaviour makes it easier to maintain without having to apply containment methods[2-1].

5.2.212 Leymus racemosus

Volga Wild Rye, Mammoth wildrye

4 tlin 8 cyuc 3 kcak 0 tcan 0 dwat 1.2 m hkuc htut cyuti hgatkyuctup hwicli hyshrasjlutnyik hpa7tli flatprikwiwis hpa7tmwatli xre7t hjonli

drutta *Leymus racemosus* is a PERENNIAL growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy)

and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

kcakta Edible Parts: Oil Seed Stem**Edible Uses:** OilSeed - used as a cereal substitute in some parts of Russia, especially in times of drought[183]. The seed is rather small and difficult to extract[K]. Young underground shoots - raw. Sweet and tender[183].

tcanta Oil Soil stabilizationPlants have an extensive spreading root system and are used to stabilize inland sand dunes, though they do not tolerate salty conditions[61].

nrakta Europe, in Russia, to central Asia and Tibet. **ksakta** Dry sandy soils[50].

propta Seed - sow mid spring in situ and only just cover the seed[162]. Germination should take place within 2 weeks. If the supply of seed is limited, it can also be sown in mid spring in a cold frame. Only just cover the seed. When large enough to handle, prick the seedlings out into individual pots and plant them out in summer[K] Division in spring or summer[162]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Succeeds in most soils, preferring a sandy soil and a sunny position[1, 200]. Established plants are drought resistant[183]. Plants can be very invasive, spreading freely by means of the rhizomes. Currently (1990) being evaluated as a perennial grain crop in N. America[183]. There are some named varieties, selected for their ornamental value[200].

5.2.213 Taxus canadensis

Canadian Yew

4 tlin 8 cyuc 3 kcak 1 tcan 4 dwat 1.5 m hkuc pcmimhmhtut cyutli kyuctup hwicli hrasjlutnyik hpa7tli frusflatprikwiwslip hpa7tmwatli dyat hjonli

drutta *Taxus canadensis* is an evergreen Tree growing to 1.5 m (5ft) by 1.5 m (5ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in leaf all year, and the seeds ripen from September to November. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

pcista All parts of the plant, except the flesh of the fruit, are highly poisonous[1, 4, 7, 10, 19, 65].

kcakta Edible Parts: Fruit**Edible Uses:** Fruit - raw[43, 46, 61, 105]. Very sweet and gelatinous, most people find it delicious though some find it sickly[K]. The fruit is a fleshy berry about 8mm in diameter and containing a single seed[200]. All other parts of this plant, including the seed, are highly poisonous. When eating the fruit you should spit out the large seed found in the fruit's centre. Should you swallow the whole seed it will just pass straight through you without harm, if the seed has been bitten into, however, it could cause some problems.

tcanta DyeA green dye can be obtained from the leaves[257].

dwatta Abortifacient Analgesic Antirheumatic Cancer Diaphoretic Diuretic Emmenagogue FebrifugeThe Canadian yew is a very poisonous plant, though it was employed medicinally by several native North American Indian tribes who used minute amounts of the leaves both internally and externally in order to treat a variety of complaints including rheumatism, fevers, influenza, expelling afterbirth and dispelling clots[213, 222, 257]. Modern research has shown that it contains the substance 'taxol' in its shoots and bark. Taxol has shown exciting potential as an anti-cancer drug, particularly in the treatment of ovarian cancers[222, 238]. This remedy is very toxic and, even when used externally, should only be used under the supervision of a qualified practitioner[238]. See also the notes above on toxicity.

183]. A smooth-skinned gooseberry[235] with a pleasant taste[183, K]. The fruit can also be dried for later use[183, 257]. The fruit is about 8 - 10mm in diameter[200].

nrakta Northern N. America - Newfoundland to Manitoba, West Virginia and South Dakota. ksacta Rocky or swampy woods and clearings[43].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. Stored seed requires 4 - 5 months cold stratification at between 0 to 9°C and should be sown as early in the year as possible[113, 164]. Under normal storage conditions the seed can remain viable for 17 years or more. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter, planting them out in late spring of the following year. Cuttings of half-ripe wood, 10 - 15cm with a heel, July/August in a frame[78, 113]. Cuttings of mature wood of the current year's growth, preferably with a heel of the previous year's growth, November to February in a cold frame or sheltered bed outdoors[78, 200].

nwatta Easily grown in a moisture retentive but well-drained loamy soil of at least moderate quality[11, 200]. Prefers a very sunny position[11]. Hardy to about -20°C[200]. Closely allied to *R. uva-crispa* and *R. oxyacanthoides*[11], it is often cultivated for its edible fruit[132] and is the parent of many disease-resistant American gooseberry cultivars[200]. It is sometimes crossed with European hybrids[200]. Plants can harbour a stage of white pine blister rust, so should not be grown in the vicinity of pine trees[155]. Plants in this genus are notably susceptible to honey fungus[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2].

5.2.210 Angelica archangelica

Angelica, Norwegian angelica
4 tlin 8 cyuc 3 kcaak 0 tcan 3 dwat 1.5 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatprik-lwis hpa7tmwatli fyifxre7t hjonli

drutta Angelica archangelica is a BIENNIAL growing to 1.5 m (5ft) by 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by insects. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All members of this genus contain furocoumarins, which increase skin sensitivity to sunlight and may cause dermatitis[238].

kcakta Edible Parts: Leaves Root Seed StemEdible Uses: CondimentLeaves - raw or cooked[2, 4, 14, 27, 37, 52]. A liquorice-like flavour[183], they can be used as a flavouring in mixed salads[K]. They are also used to sweeten tart fruits[K]. Stalks and young shoots - cooked or raw[2, 37]. The stalks should be peeled[115], they can be used like celery[183]. They can also be used to sweeten tart fruits[52] and to make jam[244]. They are often crystallised in sugar and used as sweets and cake decorations[244]. The stems are best harvested in the spring[244]. An essential oil is obtained from the root and seeds, it is used as a food flavouring[46, 57, 100, 183]. Root - cooked[2]. Seed - used as a flavouring in liqueurs such as Chartreuse[244]. A tea can be made from the leaves, seed or roots[183].

tcanta EssentialAn essential oil from the root and seeds is used in perfumery, medicinally and as a food flavouring[4, 46, 57, 100]. The oil from the seeds has a musk-like aroma and is often used to flavour liqueurs[245]. The dried root contains 0.35% essential oil, the seed about 1.3%[240]. Yields of the essential oil vary according to location, plants growing at higher altitudes have higher yields with a better aroma[240].

dwatta Antispasmodic Appetizer Carminative Diaphoretic Diuretic Expectorant Stimulant Stomachic Tonic UrinaryAngelica has a long folk-history of use as a medicinal herb, in particular for the treatment of digestive disorders and problems with blood circulation[4, 254]. The root is the

most active medicinally, it should be harvested in the autumn of its first year of growth, sliced longitudinally if necessary and dried quickly[4]. If well stored, the root retains its medicinal virtues for many years[4]. The leaves and seeds can also be used[4]. The leaves are harvested and dried in late spring before the plant comes into flower[244]. The plant is antispasmodic, carminative, diaphoretic, diuretic, expectorant, stimulant, stomachic, tonic[4, 9, 14, 21, 46, 165]. An infusion is used to ease flatulence, indigestion, chronic bronchitis and typhus[244]. It stimulates blood flow to the peripheral parts of the body and so is of value in treating poor circulation - it is considered a specific treatment for Buerger's disease, a condition that narrows the arteries of the hands and feet[254]. Angelica is contra-indicated for people with a tendency towards diabetes since its use can increase sugar levels in the urine[4]. This plant should not be prescribed for pregnant women[238], nor should the juice be allowed to come into contact with the eyes[244]. An essential oil from the seeds is sometimes used as a rub to relieve rheumatic conditions[244]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Angelica archangelica fruit for fevers and colds, infection of the urinary tract, dyspeptic complaints and loss of appetite. The root has been approved for dyspeptic complaints and loss of appetite. (see [302] for critics of commission E). No health hazards or side-effects if the proper administration of therapeutic dosages. Avoid sunbathing and intensive UV radiation for the duration of a treatment [301].

nrakta Europe. Naturalized in Britain[17]. ksacta Moist shady places in Britain[4, 14, 27, 37].

propta Seed - best sown in a cold frame as soon as it is ripe since the seed only has a short viability[200]. Seed can also be sown in the spring, though germination rates will be lower. It requires light for germination[200]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter, planting them out into their permanent positions in the spring. The seed can also be sow in situ as soon as it is ripe.

nwatta Requires a deep moist fertile soil in dappled shade or full sun[52, 200]. Tolerates a pH in the range 4.5 to 7.3. A very hardy plant, tolerating severe frosts without damage[4]. Although by nature biennial, the plants are reliably perennial if they are prevented from setting seed[200]. Angelica is occasionally cultivated in the herb garden, mainly for its culinary uses[46]. The plants have a pervading aromatic odour[4]. The growing plant is almost untroubled by pests and diseases[4]. It attracts bees and hoverflies to the garden, helping to create a natural balance of insect pests and predators[24]. When well-sited, the plant will often self-sow - sometimes to the point of nuisance[245].

5.2.211 Inula helenium

Elecampane, Elecampane inula
4 tlin 8 cyuc 3 kcaak 2 tcan 3 dwat 1.5 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikklwis hpa7tmwatli fyifxre7t hjonli

drutta Inula helenium is a PERENNIAL growing to 1.5 m (5ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista Allergic reactions. Potential to interfere with the treatment of diabetes mellitus and high blood pressure. Avoid if history of allergy [301].

kcakta Edible Parts: Leaves RootEdible Uses: Leaves - cooked. Rather bitter and aromatic[115], they were used as a potherb by the ancient Romans[183] but are rarely used at present. Root - candied and eaten as a sweetmeat[4, 7, 27, 105, 183]. It contains up to 44% inulin[46, 240]. Inulin is a starch that cannot be digested by humans. It usually passes straight through the digestive system, though it can ferment and cause wind problems for some people[K]. Inulin can be converted into a sugar that is suitable for diabetics

toxicity. The leaves are harvested in early summer before the plant flowers, the roots are harvested in the autumn. Both are dried for later use[238]. A homeopathic remedy is made from the fresh root, harvested before the plant flowers[232]. This has a very limited range of application, but is of great benefit in the treatment of broken bones and eye injuries[232].

nrakta A hybrid of garden origin, *S. asperum* x *S. officinale*[200]. ksacta Not known in a truly wild situation.

propta Seed - sow spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. This is a hybrid species that does not usually produce seed. If you have sufficient seed you can try an outdoor sowing in situ in the spring. Division succeeds at almost any time of the year. Simply use a spade to chop off the top 7cm of root just below the soil level. The original root will regrow and you will have a number of root tops, each of which will make a new plant. These can either be potted up or planted out straight into their permanent positions.

nwatta Tolerates most soils and situations but prefers a moist soil and some shade[1, 4]. Grows well in heavy clay soils. Best grown in an open sunny site in a deep rich soil if it is being grown for compost material[200]. Hardy to about -20°C[187]. A naturally occurring hybrid species (*S. asperum* x *S. officinale*), it does not set viable seed and so is not aggressive. The root system is very deep, fragments of root left in the soil can produce new plants. A number of named forms have been selected for their higher production of leaves[183]. Subject to attacks by the rust fungus, this can be alleviated by giving the plants a high potash feed, wood ashes are often used[26]. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2].

5.2.203 Prunus japonica

Korean Cherry, Japanese bush cherry
4 tlin 8 cyuc 3 kcaak 1 tcan 3 dwat 1.5 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikklwis hpa7tmwatli xre7t hjonli

drutta Prunus japonica is an evergreen Shrub growing to 1.5 m (5ft) by 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in May, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: Fruit SeedEdible Uses: Fruit - raw or cooked. A sweet agreeable flavour, they make a good pie[183]. Cherry-like, a harsh sour taste[178]. A reasonable

size, about 14mm in diameter with one large seed[200]. Seed - raw or cooked. Do not eat the seed if it is too bitter - see the notes above on toxicity.

tcanta DyeA green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168].

dwatta Aperient Carminative Demulcent Deobstruent Diuretic Lenitive OphthalmicThe kernels are aperient, carminative, demulcent, deobstruent, diuretic, hypotensive, laxative, lenitive and ophthalmic[147, 176, 178, 218, 238]. They are taken internally in the treatment of dry constipation, oedema and insomnia following a trauma[238]. The root is used in the treatment of constipation, children's fever, pin-worms and teeth ailments[218]. Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta E. Asia - China, Japan, Korea, Manchuria. ksacta Woodlands[238] in mountain valleys[178]. Forest on mountain slopes, thickets and sunny mountain slopes at elevations of 100 - 200 metres[266].

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200]. Softwood cuttings from strongly growing plants in spring to early summer in a frame[200]. Layering in spring.

nwatta Thrives in a well-drained moisture-retentive loamy soil[11, 200]. Prefers some lime in the soil but is likely to become chlorotic if too much lime is present[1]. Succeeds in sun or partial shade though it fruits better in a sunny position[11, 200]. Plants are hardy to at least -15°C[238]. A very ornamental plant[1], but it is subject to die-back[11]. Plants in this genus are notably susceptible to honey fungus[200]. The Korean cherry is sometimes cultivated for its edible fruit, there is at least one named variety[183]. The sub-species *P. japonica nakai*. (Lév.)Rehd., which comes from Manchuria, has larger plum-like fruits up to 50mm in diameter[200]. This species is closely related to *P. glandulosa*[11, 58]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238].

5.2.204 Prunus fruticosa

Mongolian Cherry, European dwarf cherry
4 tlin 8 cyuc 3 kcaak 1 tcan 1 dwat 1 m hkuc
htut cyutli kyuctup hwicli hrasjlutnyik hpa7tli flatprikklwis hpa7tmwatli xre7t hjonli

drutta Prunus fruticosa is a deciduous Shrub growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in May, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: Fruit SeedEdible Uses: Fruit - raw or cooked. A cherry-like flavour but very harsh and acid[11, 105]. A tart flavour, it can also be made into preserves or

dried for later use[183]. The fruit is about 15mm in diameter and contains one large seed[200]. Seed - raw or cooked. Do not eat the seed if it is too bitter - see the notes above on toxicity.

tcanta DyeA green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168].

dwatta Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta Europe to western and central Asia. ksacta Thickets and dry grassland[50]. Forest-steppes and steppe zone, broad-leaved forest margins, shrubby thickets, steppes and open dry slopes in Tibet[266].

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[113]. Soft-wood cuttings from strongly growing plants in spring to early summer in a frame. Layering in spring. Division of suckers during the dormant season. They can be planted out direct into their permanent positions.

nwatta Thrives in a well-drained moisture-retentive loamy soil, growing well on limestone[11, 200]. Prefers some lime in the soil but is likely to become chlorotic if too much lime is present[1]. Requires a sunny position[11, 45]. Trees are said to have withstood temperatures down to -45°c in their native habitat[183]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. Plants in this genus are notably susceptible to honey fungus[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2].

5.2.205 Stachys palustris

Marsh Woundwort, Marsh hedgenettle

4 tin 8 cyuc 3 kcaak 1 tcan 2 dwat 1 m hkuc

hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Stachys palustris is a PERENNIAL growing to 1 m (3ft 3in) by 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

pcista Avoid during pregnancy and breast feeding [301].

kcakta Edible Parts: Leaves Root SeedEdible Uses: Tubers - raw or cooked[K]. A wholesome and nutritious food[4], they have a pleasant mild nutty flavour[K]. The tubers can be dried and ground into a powder that is used in making bread etc[2, 4, 12, 115, 183]. The tubers are formed in the autumn[17]. Although quite small, they are fairly smooth and produced in a reasonable quantity so are not too fiddly to utilize[K]. Young shoots - cooked. Used as an asparagus substitute[183]. A pleasant taste but the smell is disagreeable[4]. Seed[257]. No further details are given[257].

tcanta DyeA yellow dye is obtained from the plant[207]. dwatta Antiseptic Antispasmodic Emetic Emmenagogue Expectorant Haemostatic Nerve Sedative Tonic Vulnery The plant is antiseptic, antispasmodic, emetic, emmenagogue, expectorant, haemostatic, nervine, sedative, tonic, vulnerary[4, 61, 218]. The plant has been highly valued for

its wound-healing activity, being effective against both internal and external bleeding, and is also used in the treatment of gout, cramps and pains in the joints[4]. The herb is harvested in the summer when just coming into flower and can be dried for later use[4].

nrakta Europe, including Britain, south and east from Norway to Portugal and temperate Asia to Japan. ksacta By streams and ditches, also in swamps and fens. Occasionally found on arable land[17].

propta Seed - sow spring in a cold frame. Prick out the seedlings into individual pots once they are large enough to handle and plant them out in the summer. Division in spring. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Requires a moist soil for good root production[2, 24]. A good bee plant[24]. All parts of the plant emit an unpleasant smell when bruised[245]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

5.2.206 Yucca filamentosa

Spoonleaf Yucca, Adam's needle, Desert Candle, Needle Palm, St. Peter's Palm, Spanish Bayonet, Comm 4 tin 10 cyuc 3 kcaak 4 tcan 1 dwat 1.2 m hkuc hmimhtut cyutli hgahtyuctup hwicli hyhshrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Yucca filamentosa is an evergreen Shrub growing to 1.2 m (4ft) by 0.6 m (2ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in leaf all year, in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Hand. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

pcista The roots contain saponins[222]. Whilst saponins are quite toxic to people, they are poorly absorbed by the body and so tend to pass straight through. They are also destroyed by prolonged heat, such as slow baking in an oven. Saponins are found in many common foods such as beans[K]. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K].

kcakta Edible Parts: Flowers Fruit StemEdible Uses: Fruit - raw or cooked[2, 46, 61]. Large and fleshy[161, 183]. The fruit is often dried for winter use[1]. Flowers - raw or dried, crushed and used as a flavouring[159, 164, 177]. A tasty addition to the salad bowl[183]. We have found the flowers to be fairly bitter[K]. Flowering stem - cooked and used like asparagus[164].

tcanta Brush Fibre Paper SoapA fibre obtained from the leaves is used for making ropes, cloth, baskets and mats[21, 46, 61, 82, 169]. The fibre can also be used for making paper[189] The leaves are harvested in summer, they are scraped to remove the outer skin and are then soaked in water for 24 hours prior to cooking. The fibres are cooked for 2 hours with lye and then beaten in a ball mill for 4 hours. They make a cream paper[189]. The leaves are used as paint brushes[92]. The roots are rich in saponins and can be used as a soap substitute for washing the hair, body and clothing[46, 61, 82, 257].

dwatta Poultice SalveMedicinal Parts: Leaves and roots of non-flowering plants[301]. A poultice made from the roots is used in the treatment of sores, skin diseases and sprains[222, 257]. Liver and gallbladder disorders[301].

nrakta South-eastern N. America - Southern New Jersey to Florida. Naturalized in S. Europe. ksacta Sand dunes, waste ground and pine forests along the coastal plain[11, 43].

propta Seed - sow spring in a greenhouse. Pre-soaking the seed for 24 hours in warm water may reduce the germination time. It usually germinates within 1 - 12 months if kept at a temperature of 20°c. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse or cold frame for at least their first two winters. Plant them out into their permanent positions in early summer and consider giving them some winter protection for at least their first winter outdoors - a simple pane of glass is usually sufficient[K]. Seed is not produced in Britain unless the flowers are hand pollinated. Root cuttings in late winter or early spring. Lift in April/May and remove small buds from base of stem and rhizomes. Dip in dry wood ashes to stop any bleeding and plant in a sandy soil in pots in a greenhouse until established[78]. Division of suckers in late spring. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the following spring.

nwatta Agroforestry Services: Living fence Industrial Crop: Fiber Management: Standard Regional Croplandscape Uses:Border, Container, Erosion control, Foundation, Ground cover, Massing, Rock garden, Seashore, Specimen. A very easily grown plant, it thrives in most soils but prefers a sandy loam and full exposure to the south[11]. Dislikes peaty or chalky soils[111]. Can succeed in light shade[K]. Plants are hardier when grown on poor sandy soils[200]. Established plants are very drought resistant[190]. Plants are hardy to at least -15°c when grown in a well-drained soil. This species is one of the toughest members of the genus and once established is capable of surviving, and even thriving, despite considerable neglect. Plants growing in dense weed competition on our Cornwall trial grounds have managed to spread and even flower[K]. A very ornamental and free flowering species[1], there are some named varieties[182]. In the plants native environment, its flowers can only be pollinated by a certain species of moth. This moth cannot live in Britain and, if fruit and seed is required, hand pollination is necessary. This can be quite easily and successfully done using something like a small paint brush. Individual crowns are monocarpic, dying after flowering[233]. However, the crown will usually produce a number of sideshoots before it dies and these will grow on to flower in about four years[233]. Plants in this genus are notably resistant to honey fungus[200]. Members of this genus seem to be immune to the predations of rabbits[233]. Special Features:Attracts birds, Attractive foliage, North American native, Attracts butterflies, Attractive flowers or blooms.

5.2.207 Tragopogon dubius

Yellow Salsify

4 tin 8 cyuc 3 kcaak 0 tcan 0 dwat 1 m hkuc

htut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Tragopogon dubius is a ANNUAL/PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Leaves RootEdible Uses: Root - raw or cooked[105, 183]. Fleshy[177]. Young stems, when 5 - 10cm high, and the bases of the lower leaves - raw or cooked. Used as a potherb[183].

nrakta Europe to W. Asia - Austria and N. France eastwards. ksacta Fields in Turkey, 400 - 1840 metres[93].

propta Seed - sow spring in situ. Make sure to water the seed in if the weather is dry.

nwatta Succeeds in ordinary garden soils, including heavy clays[200].

5.2.208 Ribes lacustre

Prickly Blackcurrant, Prickly currant

4 tin 8 cyuc 3 kcaak 2 tcan 1 dwat 1.5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Ribes lacustre is a deciduous Shrub growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Skin contact with the spines can cause an allergic reaction in some people[101].

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 3, 85, 101, 257]. Tart and very juicy[183]. The fully ripe fruit has an agreeable flavour[256]. When crushed the fruit has a foul odour[43] but when eaten by the handful the odour is inoffensive (this sounds a bit strange!) and when cooked they make a good sauce[183]. The fruit can also be dried for later use or used to make jams and preserves[257]. The fruit is about 5mm in diameter[200] and is covered with weak gland-tipped bristles[235].

tcanta Needles StringThe roots have been boiled with cedar (Juniperus spp, Thuja sp.) and wild rose (Rosa spp) roots, then pounded and woven into rope[257]. The sharp thorns have been used as probes for boils, for removing splinters and for tattooing[257].

dwatta Analgesic Birthing aid Laxative Ophthalmic StomachicThe leaves or the bark can be chewed and then placed on sores caused by the prickles of this plant[257]. A decoction of the bark has been used as a wash for sore eyes[257]. The decoction has also been taken by women during labour to ease the birth[257]. A decoction of the root can be taken several times a day as a treatment for constipation[257]. A decoction of the twigs has been taken in the treatment of general body aches[257]. A decoction of dried branches has been used in the treatment of stomach complaints, diarrhoea and colds[257].

nrakta N. America - Newfoundland to Alaska, south to Massachusetts, New York, Pennsylvania and California. ksacta Cold damp woods[43]. Swamps and wet woods[235].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. Stored seed requires 4 - 6 months cold stratification at about 0°c and should be sown as early in the year as possible[113, 164]. Under normal storage conditions the seed can remain viable for 17 years or more. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter, planting them out in late spring of the following year. Cuttings of half-ripe wood, 10 - 15cm with a heel, July/August in a frame[78, 113]. Cuttings of mature wood of the current year's growth, preferably with a heel of the previous year's growth, November to February in a cold frame or sheltered bed outdoors[78, 200].

nwatta Easily grown in a moisture retentive but well-drained loamy soil of at least moderate quality[11, 200]. Plants are quite tolerant of shade though do not fruit so well in such a position[11]. Hardy to about -20°c[200]. Although this plant has spines, it belongs to the blackcurrant section of the genus[101]. Plants can harbour a stage of 'white pine blister rust', so they should not be grown in the vicinity of pine trees[155]. Plants in this genus are notably susceptible to honey fungus[200].

5.2.209 Ribes hirtellum

Currant-Gooseberry, Hairystem gooseberry

4 tin 8 cyuc 3 kcaak 0 tcan 0 dwat 1 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

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

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked in jams, jellies, pies, preserves etc[3, 11, 85, 101,

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

kcakta Edible Parts: Flowers **Leaves****Edible Uses:** Leaves - raw or cooked[2, 7, 52, 115]. The flavour is somewhat acrid[4]. A pleasant sour flavour according to another report[238] whilst a third says that they are mild and agreeable and are used in salads[217]. The daisy is occasionally used as a potherb[183]. Flower buds and petals - raw[144, 183]. Eaten in sandwiches, soups and salads[183].

tcanta RepellentAn insect repellent spray can be made from an infusion of the leaves[57]. Daisies have traditionally been used for making daisy chains in children's games.

dwatta Anodyne Antidiarrhoeal Antispasmodic Antitussive Cancer Demulcent Digestive Eczema Emollient Expectorant Laxative Ophthalmic Purgative TonicDaisies are a popular domestic remedy with a wide range of applications[7]. They are a traditional wound herb[238] and are also said to be especially useful in treating delicate and listless children[7]. Recent research (1994) has been looking at the possibility of using the plant in HIV therapy[238]. The herb is mildly anodyne, antispasmodic, antitussive, demulcent, digestive, emollient, expectorant, laxative, ophthalmic, purgative and tonic[7, 9, 21]. The fresh or dried flowering heads are normally used[9]. An infusion is used in the treatment of catarrh, rheumatism, arthritis, liver and kidney disorders, as a blood purifier etc[9]. The daisy once had a great reputation as a cure for fresh wounds[4]. An ointment made from the leaves is applied externally to wounds, bruises etc[4, 232] whilst a distilled water is used internally to treat inflammatory disorders of the liver[4]. Chewing the fresh leaves is said to be a cure for mouth ulcers[244]. Daisies also have a reputation for effectiveness in treating breast cancers[7]. The flowers and leaves are normally used fresh in decoctions, ointments and poultices[238]. A strong decoction of the roots has been recommended for the treatment of scorbic complaints and eczema, though it needs to be taken for some time before its effect becomes obvious[244]. A mild decoction may ease complaints of the respiratory tract, rheumatic pains and painful or heavy menstruation[244]. The plant, harvested when in flower, is used as a homeopathic remedy[232]. Its use is especially indicated in the treatment of bruising etc[232].

nrakta Most of Europe, including Britain, to W. Asia. **ksacta** A common plant of meadows, lawns and other grassy areas, it is very frequently found growing in lawns[17].

propta Seed - sow as soon as the seed is ripe in June. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in late summer[200]. Division after flowering[200]. Very easy, it can be done at almost any time of the year, though spring and early summer are best[K]. The divisions can be planted straight out into their permanent positions.

nwatta Landscape **Uses:**Alpine garden, Border, Container, Ground cover, Rock garden. Succeeds in most well-drained soils in sun or semi-shade[188, 200]. The daisy is commonly found growing in many lawns, some varieties have been developed for the flower garden[1]. It is a good plant for the spring meadow[24]. The plants have a very long flowering season, they will even produce a few flowers in the middle of mild winters[K]. **Special Features:** Edible, Not North American native, Naturalizing, Attracts butterflies, Suitable for dried flowers. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

5.2.313 Prunus x cistena

Purple-Leaf Sand Cherry
4 tlin 8 cyuc 2 kcak 0 tcan 1 dwat 2 m hkuc
hmmihmt cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Prunus x cistena is a deciduous Shrub growing to 2 m (6ft) by 2 m (6ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: Fruit **Seed****Edible Uses:** Fruit - raw or cooked. The fruit contains a single large seed. Seed - raw or cooked. Do not eat the seed if it is too bitter - see the notes above on toxicity.

tcanta Dye Hedge HedgeA green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168]. Plants can be used for hedging[11].

dwatta Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta A hybrid of garden origin, P 'Pissardi' x P. pumila or P. besseyi. **ksacta** Not known in the wild.

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. This species is a hybrid and will not breed true from seed. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200]. Softwood cuttings from strongly growing plants in spring to early summer in a frame[200]. Layering in spring.

nwatta Thrives in a well-drained moisture-retentive loamy soil[11, 200]. Prefers some lime in the soil but is likely to become chlorotic if too much lime is present[1]. Succeeds in sun or partial shade though it fruits better in a sunny position[11, 200]. Succeeds in most soils in a sunny position[184]. Dormant plants are hardy to about -30°C[184]. A slow and weak grower[200]. There are several named forms, selected for their ornamental value[200]. The cultivar 'Schmidtteis' is taller growing, to 5 metres, and more vigorous[200]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. Plants in this genus are notably susceptible to honey fungus[200].

5.2.314 Malus toringoides

Cutleaf crab apple
4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 8 m hkuc
hmmihmt cyutli tcup hwicli hrasjlutnyikrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Malus toringoides is a deciduous Tree growing to 8 m (26ft) by 10 m (32ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs)

leaves will reduce their content of oxalic acid. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Edible Parts: Leaves **Root** **Seed****Edible Uses:** Leaves - raw or cooked[2, 7, 9, 103]. One report says that they are rather bitter[5], but we have found them to have a fairly mild flavour, especially when the leaves are young, though the texture is somewhat chewy when they are eaten raw[7, K]. They make an excellent substitute for spinach[183]. In Northern England the leaves are an ingredient of a bitter Lenten pudding, called Easter ledger pudding, that is eaten at Lent[183]. The leaves are available from late winter in most years and can be eaten until the early autumn though they become much tougher as the season progresses[K]. The leaves are a good source of vitamins A and C[257], a nutritional analysis is available[218]. Seed - raw or cooked[172]. The seed is very small and rather fiddly to utilize[K]. Root - raw or cooked[7, 172, 257]. Rich in starch and tannin, it is steeped in water and then roasted in order to reduce the tannin content[4, 115]. It is then said to be a tasty and nutritious food[4]. The root has also been boiled or used in soups and stews[183] and can be dried then ground into a powder and used in making bread[4]. The root contains 30% starch, 1% calcium oxalate and 15 - 36% tannin[218].

tcanta TanninThe roots contain up to 21% tannin[223].

dwatta Antidiarrhoeal Astringent Cholera Demulcent Diuretic Dysentery Epilepsy Febrifuge Laxative StypticBistort is one of the most strongly astringent of all herbs and it is used to contract tissues and staunch blood flow[254]. The root is powerfully astringent, demulcent, diuretic, febrifuge, laxative and strongly styptic[4, 218]. It is gathered in early spring when the leaves are just beginning to shoot, and then dried[4]. It is much used, both internally and externally, in the treatment of internal and external bleeding, diarrhoea, dysentery, cholera etc[4, 9, 13, 21, 147, 165, 172]. It is also taken internally in the treatment of a wide range of complaints including catarrh, cystitis, irritable bowel syndrome, peptic ulcers, ulcerative colitis and excessive menstruation[238, 254]. Externally, it makes a good wash for small burns and wounds, and is used to treat pharyngitis, stomatitis, vaginal discharge, anal fissure etc[238, 254]. A mouth wash or gargle is used to treat spongy gums, mouth ulcers and sore throats[254]. The leaves are astringent and have a great reputation in the treatment of wounds[4]. In Chinese medicine the rhizome is used for: epilepsy, fever, tetanus, carbuncles, snake and mosquito bites, scrofula and cramps in hands and feet [301]. Considered useful in diabetes [301].

nrakta Northern and central Europe, including Britain, mountains of S. Europe, western and central Asia. **ksacta** Damp meadows and by water, especially on acid soils[13, 17].

propta Seed - sow spring in a cold frame. Germination is usually free and easy. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer if they have reached sufficient size. If not, overwinter them in a cold frame and plant them out the following spring after the last expected frosts. Division in spring or autumn. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Landscape **Uses:**Container, Ground cover. Succeeds in an ordinary garden soil[1] but prefers a moisture retentive not too fertile soil in sun or part shade[200]. The plant repays generous treatment[1]. A very cold-hardy plant, tolerating temperatures down to at least -25°C[187]. Bistort was formerly cultivated as a medicinal and edible plant[4], though it has now fallen into virtual disuse. Plants are somewhat spreading, forming quite extensive colonies[187] especially in low-lying pastures[4]. They seem to be immune to the predations of rabbits[233]. **Special Features:** Attractive foliage, Edible, Not North American native, Invasive, Suitable for cut flowers, Suitable for dried flowers. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

5.2.243 Cardamine amara

Large Bittercress
4 tlin 8 cyuc 3 kcak 0 tcan 1 dwat 0.6 m hkuc
hmmihmt cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyfkrx7t hjonli

drutta Cardamine amara is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to June, and the seeds ripen from May to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves**Edible Uses:** Leaves - raw[2, 61, 115]. A hot cress-like flavour[183], nice in small quantities in a salad and available all year round in most years[K]. A somewhat bitter flavour[9].

dwatta Antiscorbutic Diuretic StimulantAntiscorbutic, diuretic, stimulant[132].

nrakta Most of Europe, including Britain, north to 64° N., east to the Balkans and W. Asia. **ksacta** By springs, in fens and on streamside, preferring a peaty soil[17]. Often found in trickling water[187]. Often the dominant ground flora in alder woods with moving damp water[17].

propta Seed - sow outdoors in situ in a shady position in April.

nwatta Easily grown in most moist soils[187]. Prefers a moist humus rich soil in shade or semi-shade[200]. Plants are hardy to at least -20°C[187]. An invasive plant spreading freely by self-sowing, it is best suited to the wild garden[187]. A polymorphic species[132].

5.2.244 Lycopos uniflorus

Bugleweed, Northern bugleweed
4 tlin 8 cyuc 3 kcak 0 tcan 1 dwat 0.3 m hkuc
hmmihmt cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Lycopos uniflorus is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: Root**Edible Uses:** Root - raw or cooked[55, 61, 62, 105, 161]. The roots were a staple food for some native North American Indian tribes[257]. The crisp white tubers can be eaten raw in salads or cooked in soups etc[183]. When boiled for a short time they are said to make an agreeable vegetable, somewhat like Chinese artichokes (Stachys affinis)[183].

dwatta Antitussive SedativeThe whole plant is antitussive and sedative[61].

nrakta N. America - Newfoundland to British Columbia, North Carolina, Nebraska and Oregon **ksacta** Low, wet or boggy ground in the north of its range, wet woodland in the south[43].

propta Seed - sow spring or autumn in a cold frame[238]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse for their first year. Plant them out into their permanent positions in early summer. Division in spring or autumn[238]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta We have very little information on this species and do not know if it will be hardy in Britain, though judging by its native range it should succeed outdoors in many parts of the country. This species might be no more than a synonym for L. virginicus, a species known to be hardy in Britain. The following notes are based on the general needs of the genus. Tolerates most soil types so long as they are wet. Succeeds in damp meadows or in wet places by ponds

or streams[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2]. The root pattern is tuberous with swollen potato-like roots [1-2].

5.2.245 Hosta longipes

4 tlin 8 cyuc 3 kcaak 3 tcan 0 dwat 0.3 m hkuc pcmhmimhtut cyutli hgattcup hwicli hrasjlutnyikfrip hpa7tli flatprikkwis hpa7tmwatli xre7t hjonli

drutta Hosta longipes is a PERENNIAL growing to 0.3 m (1ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from July to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought.

kcakta Edible Parts: Leaves StemEdible Uses: Young leaves and leaf stems - cooked. Sourish[105]. A very acceptable taste, but somewhat fibrous[K].

tcanta A good ground cover plant, succeeding in dense shade.

nrakta E. Asia - Japan, Korea. ksacta Usually found growing on trees or rocks in the wild[251].

propta Seed - sow spring in a lightly shaded position in a greenhouse and only just cover the seed. Germination usually takes place within 1 - 3 months at 10°C. Make sure you keep the compost moist. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division is possible at almost any time of the year so long as there is sufficient moisture[233]. It is best carried out in March as growth commences or in early autumn if the soil is not too dry[200]. Hostas can be left undivided for many years and should not be divided any more frequently than once every 3 - 5 years to allow the leaves to reach maturity[200].

nwatta Thrives in most fertile soils if they are rich in humus[200]. Grows well in heavy clay soils and in sandy ones[208]. Very limy soils inhibit growth, but plants can thrive in such a situation if plenty of humus is added[208]. Prefers a pH between 6 and 7[200]. Requires a rich soil that does not dry out readily[1]. Another report says that once established it is drought tolerant[187]. Does well in the semi-shade of a woodland[200] also succeeding in deeper shade[187]. In general, the sunnier the position the moister the soil should be[233]. Plants are best not grown under trees in town gardens since the soil washed from the leaves of the trees in wet weather will tend to remain on the hosta[208]. Plants flower better when grown in a sunny position but the foliage is better when the plant is in a shady position[200]. Plants are in general fully hardy in Britain, but young leaves in spring can be destroyed by frost. New leaves are only produced in the spring and very early summer, so any damage at this time has a deep effect on the plant[233]. A vigorous plant, forming medium sized clumps. The roots travel extensively[200]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Plants are very attractive to slugs and snails, the young shoots in spring are especially at risk[111, K]. Hybridizes freely with other members of this genus, especially with *H. kikutii*[200].

5.2.246 Rubus illecebrosus

Strawberry-Raspberry

4 tlin 8 cyuc 3 kcaak 3 tcan 0 dwat 0.6 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikkwis hpa7tmwatli xre7t hjonli

drutta Rubus illecebrosus is a deciduous Shrub growing to 0.6 m (2ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is

in flower in July, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. Fairly large and sweet but insipid raw[11, K]. The fruit is said to develop more flavour when it is cooked[183]. Another report says that the fruit is sour, bitter and unpalatable raw[3, 183], though this does not agree with the plants we are growing[K]. The fruit is about 30mm in diameter[200].

tcanta DyeA purple to dull blue dye is obtained from the fruit[168]. A good ground cover plant for a sunny position or light shade[3]. It spreads freely once established, but dies down over the winter and thus can allow other species to invade[K].

nrakta E. Asia - Japan. ksacta Thickets and waste ground[58].

propta Seed - requires stratification and is best sown in early autumn in a cold frame. Stored seed requires one month stratification at about 3°C and is best sown as early as possible in the year. Prick out the seedlings when they are large enough to handle and grow on in a cold frame. Plant them out into their permanent positions in late spring of the following year. Cuttings of half-ripe wood, July/August in a frame[200]. Tip layering in July. Plant out in autumn. Division in early spring or just before leaf-fall in the autumn[200].

nwatta Easily grown in a good well-drained loamy soil in sun or semi-shade[1, 11, 200]. Sometimes cultivated for its edible fruit and occasionally naturalized in Europe[50]. Plants spread freely when in a suitable site and are apt to become invasive[182]. The plant adopts an almost herbaceous habit and is botanically a sub-shrub, only a small amount of woody stem persists overwinter[K]. Plants in this genus are notably susceptible to honey fungus[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. An evergreen. The plant growth habit is a running thicket former forming a colony from shoots away from the crown spreading indefinitely [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

5.2.247 Stellaria jamesiana

tuber starwort

4 tlin 9 cyuc 3 kcaak 0 tcan 0 dwat 0.5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikkwis hpa7tmwatli xre7t hjonli

drutta Stellaria jamesiana is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no mention has been seen for this species, the leaves of some members of this genus contain saponins. Although toxic, these substances are very poorly absorbed by the body and so tend to pass through without causing harm. They are also broken down by thorough cooking. Saponins are found in many plants, including several that are often used for food, such as certain beans. It is advisable not to eat large quantities of food that contain saponins. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K]. *Stellaria jamesiana* Torr. is a synonym of *Pseudostellaria jamesiana* (Torr.) W.A. Weber and R.L. Hartm.

kcakta Edible Parts: Leaves RootEdible Uses: Young leaves - raw or cooked. Root - raw or cooked. Sweet and pleasant[85].

nrakta Western N. America. ksacta Moist woodland amongst shrubs, westwards from Wyoming and Texas[85].

propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their

5.2.310 Apocynum cannabinum

Indian Hemp

4 tlin 8 cyuc 2 kcaak 3 tcan 2 dwat 0.6 m hkuc

pcimhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikkwis hpa7tmwatli xre7t hjonli

drutta *Apocynum cannabinum* is a PERENNIAL growing to 0.6 m (2ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Lepidoptera (Moths and Butterflies). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All parts of the plant are poisonous[1, 4, 19, 62]. It contains toxic cardioactive glycosides[222].

kcakta Edible Parts: SeedEdible Uses: GumSeed - raw or cooked[257]. It can be ground into a powder and used as a meal[94]. A latex obtained from the plant is used as a chewing gum[61, 94, 177]. After the latex has been squeezed from the plant it s allowed to stand overnight to harden into a white gum[257]. The latex was sometimes mixed with clean clay[257].

tcanta Fibre Gum LatexThe flowers are attractive to bees[418]. Other Uses: A very good quality fibre obtained from the bark is used for making clothes, twine, bags, linen, paper etc[1, 46, 61, 92, 94, 95, 189, 257]. It is about 12 - 18mm long[189]. Very strong[99], it is used as a flax substitute[57], it does not shrink and it retains its strength in water[99]. The fibre is produced late in the season[85], it can be harvested after the leaves fall in autumn but are probably at its best as the seed pods are forming[169]. When making paper, the stems can be retted by leaving them in the ground until they are dry in the winter or they can be harvested in late summer, the leaves removed and the stems steamed to remove the fibre[189]. The stems are then cooked for two hours with lye and pounded with mallets[189]. The plant yields a latex which is a possible source of rubber[46, 61, 177]. The latex is also used as chewing gum. Carbon Farming - Industrial Crop: hydrocarbon, fibre. The dogbane-milkweed family Asclepias, Apocynum, Calotropis, and *Trachomitum* spp) has been used for fiber industrial crops for millennia with a number in cultivation as regional crops. All of these crops are dual-purpose fibres, offering bast fibres from the stem and seed fibre or 'floss' in the fruit pods. Many have also been identified as potential hydrocarbon crops due to high latex content. Could be integrated into various agroforestry systems rather than as monocultures [1-1].

dwatta Antirheumatic Cardiotonic Diaphoretic Diuretic Emetic Expectorant Tonic Urinary VD Vermifuge WartsIndian hemp is an unpleasantly bitter stimulant irritant herb that acts on the heart, respiratory and urinary systems, and also on the uterus[238]. It was much employed by various native North American Indian tribes who used it to treat a wide variety of complaints including rheumatism, coughs, pox, whooping cough, asthma, internal parasites, diarrhoea and also to increase milk flow in lactating mothers[257]. The plant is still used in modern herbalism, but it should be used with great caution, and only under the supervision of a qualified practitioner if taken internally[4, 222, 238]. See the notes above on toxicity[4, 222]. The root is cardiotonic, diaphoretic, diuretic, emetic and expectorant[4, 46, 61, 94, 238]. It is harvested in the autumn and dried for later use[238]. The fresh root is the most active part medicinally. It has been used in the treatment of syphilis and as a tonic[207]. A weak tea made from the dried root has been used for cardiac diseases[207, 222]. A tea made from the root has been used as a vermifuge[213]. The milky sap is a folk remedy for venereal warts[222].

nrakta North-eastern N. America. ksacta Gravelly or sandy soil, mainly near streams[4]. A common weed of cultivated land[60], usually found in shady or moist places[94].

propta Seed - best sown as soon as it is ripe in late summer and overwintered outdoors. The seed requires a period of cold stratification if it is to germinate well[238]. Prick out the seedlings when large enough to handle and grow them on in a cold frame for their first winter, planting out in late spring of the following year[K]. Division in spring just before active growth begins[200]. Plants can also be divided in the autumn[238].

nwatta Industrial Crop: Fiber Industrial Crop: Hydrocarbon Management: Hay Minor Global CropSucceeds in sun or shade in most well-drained moist soils[169, 238]. Plants can be invasive[200]. The young shoots of this plant are extremely attractive to slugs[K]. Carbon Farming - Cultivation: minor global crop. Management: hay.

5.2.311 Malus lancifolia

4 tlin 8 cyuc 2 kcaak 0 tcan 0 dwat 6 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikkwis hpa7tmwatli xre7t hjonli

drutta *Malus lancifolia* is a deciduous Tree growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177]. Up to 3cm in diameter[200].

tcanta The wood weighs 43lb per cubic foot.

nrakta Eastern N. America - Pennsylvania to Virginia, Illinois and North Carolina. ksacta Thickets[235].

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

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[1, 200]. There is some confusion over the correct name of this species. [43] gives the name as a synonym of *M. coronaria lancifolia* (along with *M. bracteata* for which we also have a record) whilst [200] recognizes it as a separate species. In [82] it is treated as part of *M. coronaria*. The fruit is a good wildlife food source, especially for birds[200]. Hybridizes freely with other members of this genus[200]. Plants in this genus are notably susceptible to honey fungus[200].

5.2.312 Bellis perennis

Daisy, Lawndaisy, English Daisy

4 tlin 8 cyuc 2 kcaak 1 tcan 3 dwat 0.2 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikkwis hpa7tmwatli fyfkrx7t hjonli

drutta *Bellis perennis* is an evergreen Perennial growing to 0.2 m (0ft 8in) by 0.2 m (0ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in leaf all year; in flower all year, and the seeds ripen from May to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils

decoction has been used to treat colds, itches, fevers and snakebites[257]. A poultice of the chewed plant has been applied to snakebites[257].

nrakta Western N. America. ksacta Barrens, plains and dry hills[43]. Streambanks, roadsides and waste areas in Texas[274].

propta Seed - sow August/September or April in situ. The seed germinates better if it is cold stratified, therefore the autumn sowing is liable to be more successful.

nwatta We have very little information on this plant, but it can be grown outdoors at least in southern Britain and probably in the north as well. It is likely to need a well-drained soil in a sunny position[K].

5.2.307 Helianthus doronicoides

4 tlin 8 cyuc 2 kcaak 0 tcan 0 dwat 1.8 m hkuc htut cyutli tcup hwicli hrasljutnyik hpa7tli flatpriklwiss hpa7tmwatli xre7t hjonli

drutta Helianthus doronicoides is a PERENNIAL growing to 1.8 m (6ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from September to October, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Tubers - cooked[2, 46, 61]. A similar taste to Jerusalem artichokes but less productive because the tubers are very thin[K].

nrakta Central N. America - Ohio to Missouri and Arkansas. ksacta Dry woods, thickets and clearings[43].

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

nwatta Succeeds in moist soils in a sunny position[1]. Requires a rich soil[1]. Dislikes shade[1]. Plants have a running root system and can be invasive in suitable conditions[233]. The young growth is extremely attractive to slugs, plants can be totally destroyed by them[K]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Possibly a naturally occurring hybrid, *H. giganteus* x *H. molis*[200].

5.2.308 Taraxacum obovatum

4 tlin 8 cyuc 2 kcaak 0 tcan 0 dwat 0.2 m hkuc hmimhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatpriklwiss hpa7tmwatli fyfjxre7t hjonli

drutta Taraxacum obovatum is a PERENNIAL growing to 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Coffee TeaLeaves - raw or cooked. They have a mild flavour[217]. The following uses are also probably applicable to this species, though we have no records for them[K] Root - cooked[183]. Flowers - raw or cooked[183]. The unopened flower buds can be used in fritters[183]. The whole plant is dried and used as a tea[177, 183]. A pleasant tea is made from the flowers. The leaves and the roots can also be used

to make tea. The root is dried and roasted to make a coffee substitute.

nrakta S. Europe - Mediterranean. ksacta Not known propta Seed - sow spring in a cold frame and either surface-sow or only just cover the seed. Make sure the compost does not dry out. Germination should take place within 2 weeks. Prick out the seedlings into individual pots when they are large enough to handle, choosing relatively deep pots to accommodate the tap root. Plant them out in early summer. Division in early spring as the plant comes into growth.

nwatta Prefers a well-drained humus-rich soil in full sun or light shade. According to one report this species reproduces apomictically and sexually[50], whilst another report says that only apomictic seed production is undergone[110]. Apomixy is an asexual method of seed production where each seed is genetically identical to the parent plant. Occasionally seed is produced sexually, the resulting seedlings are somewhat different to the parent plants and if these plants are sufficiently distinct from the parents and then produce apomictic seedlings these seedlings are, in theory at least, a new species.

5.2.309 Trillium sessile

Toadshade

4 tlin 8 cyuc 2 kcaak 0 tcan 1 dwat 0.4 m hkuc pcmhmimhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatpriklwiss hpa7tmwatli xre7t hjonli

drutta Trillium sessile is a PERENNIAL growing to 0.4 m (1ft 4in) by 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked. The young unfolding leaves are an excellent addition to the salad bowl, tasting somewhat like sunflower seeds[183]. The leaves can also be cooked as a potherb[183].

dwatta Miscellany SkinA poultice of the bruised leaves and crushed roots has been applied as a treatment for boils[257]. A decoction of the plant has been used to treat any kind of sickness[257].

nrakta Eastern N. America. ksacta Rich woodlands, limestone districts, calcareous soils, floodplains, riverbanks, clayey alluvium, less fertile soils, high, dry limestone woods, persists under light pasturing, 100 - 300 metres[270].

propta Seed - best sown in a shaded cold frame as soon as it is ripe[134, 200]. Stored seed should be sown in late winter or early spring. Seed usually germinates within 1 - 3 months at 15°C. Another report says that seeds produce a root after the first cold stratification but no shoot is produced until after a second winter[138], whilst yet another report says that the seed can take 3 years to germinate[238]. The seedlings are prone to damp off and must therefore be watered with care and given plenty of fresh air[138]. The young plants need to be overwintered in a cold frame for the first year and can then be planted out in late spring. It is very important that the pots become neither too dry nor too wet[138]. Division with care when the plants die down after flowering[200]. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the following spring.

nwatta Prefers a deep well-drained woodland or humus-rich soil in a somewhat shady position that remains moist in the summer[1, 42]. Prefers a neutral to slightly acid soil[200]. Grows well in open woodland[1]. Succeeds in deep shade[188]. Succeeds in a sunny position if the soil does not dry out[42]. Any transplanting is best done whilst the plants are in flower[200]. Plants can flower in two years from seed[138]. The flowers have a scent similar to a butcher's shop[207]. Another report says that they are sweetly scented[245]. Some named varieties have been selected for their ornamental value[200]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233], though slugs are very fond of the leaves[238].

first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring.

nwatta We have very little information on this species and do not know if it will be hardy outdoors in Britain, though judging by its native range it should succeed outdoors at least in the milder parts of the country. Prefers a moist loamy site[85]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is tuberous with swollen potato-like roots [1-2].

5.2.248 Tussilago farfara

Coltsfoot

4 tlin 8 cyuc 3 kcaak 3 tcan 3 dwat 0.2 m hkuc hmimhtut cyutli tcup hwicli hrasljutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli fyfjxre7t hjonli

drutta Tussilago farfara is a PERENNIAL growing to 0.2 m (0ft 8in) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from February to April, and the seeds ripen from March to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

pcista The plant contains traces of liver-affecting pyrrolizidine alkaloids and is potentially toxic in large doses[222]. These alkaloids have not proved toxic at low dosages in tests and there is no suggestion that this plant should not be used medicinally[238]. Contraindicated during pregnancy and lactation [301]

kcakta Edible Parts: Flowers Leaves OilEdible Uses: Oil Salt TeaFlower buds and young flowers - raw or cooked[46, 183]. A pleasant aniseed flavour[K], they add a distinctive aromatic flavour to salads[9]. Young leaves - raw or cooked[9, 46, 183]. They can be used in salads, added to soups, or cooked as a vegetable[238]. The leaves have a bitter taste unless they are washed after being boiled[179]. An aromatic tea is made from the fresh or dried leaves and flowers[183]. It has a liquorice-like flavour[238]. The dried and burnt leaves are used as a salt substitute[102, 183]. The slender rootstock is candied in sugar syrup[183].

tcanta Compost Oil Soil stabilization Stuffing TinderThe soft down on the underside of the leaves is used as a stuffing material[53, 54]. When wrapped in a rag, dipped in salt-petre and dried in the sun it makes an excellent tinder[4]. Plants have an extensive root system and are used to stabilize banks[200]. The leaves are a valuable addition to the compost heap[200].

dwatta Antitussive Astringent Bitter Demulcent Diaphoretic Eczema Emollient Expectorant Skin Stimulant TonicAn effective demulcent and expectorant herb, coltsfoot is one of the most popular European remedies for the treatment of a wide range of chest complaints[254]. It is widely available in health food shops. The leaves are commonly used in Europe, though the flowering stems (which contain higher levels of pyrrolizidine alkaloids) are preferred in China[254]. They are rich in mucilage and are the main parts used, though the root is also sometimes employed[4, 244]. Pyrrolizidine alkaloids have a toxic effect upon the liver, but are largely destroyed when the plant is boiled to make a decoction[254]. Some caution should be employed in the use of this remedy - the flowers should not be used except under professional supervision, the leaves should not be used for more than 4 - 6 weeks at a time, the herb should not be taken whilst pregnant or breast-feeding and it should not be given to children under the age of six[254]. Modern research has shown that extracts of the whole plant can increase immune resistance[254]. In a Chinese trial 75% of patients suffering from bronchial asthma showed some improvement after treatment with this plant, though the anti-asthmatic effect was short-lived[254]. The leaves are harvested in June and early July, the flowers are harvested when fully open and the root is harvested in the autumn. All can be dried and used as

required[4]. The plant is antitussive, astringent, demulcent, emollient, expectorant, stimulant and tonic. It is widely used in the treatment of coughs and respiratory problems[4, 7, 9, 13, 21, 54, 165, 176, 218] and is often candied so that it can be sucked as a sweet[4]. The plant is of particular use in the treatment of chronic emphysema and silicosis, helping to relieve the persistent cough associated with these conditions[244]. Coltsfoot is particularly effective when used in combination with liquorice (*Glycyrrhiza* species), thyme (*Thymus vulgaris*) and wild cherry (*Prunus serotina*)[254]. A poultice of the flowers has a soothing effect on a range of skin disorders including eczema, ulcers, sores, bites and inflammations[7, 238]. A bitter, tonic and diaphoretic preparation can be obtained from the root[7].

nrakta Europe, including Britain, from Norway south and east to N. Africa, western and northern Asia. ksacta Damp habitats, frequently on alkaline clays, in hedgebanks, roadsides, wasteland, often as a pioneer, and on dunes and shingle in coastal zones[200].

propta Seed - the plant does not usually require help with spreading itself around, but if required the seed can be sown in situ in early spring or autumn. Division of the roots is very easy and succeeds at almost any time in the year. The divisions can be planted out direct into their permanent positions.

nwatta A very easily grown plant, it succeeds in most soils when grown in full sun[14]. It prefers a moist neutral to alkaline soil and will also succeed in partial shade[238]. Plants are hardy to about -29°C[238]. Coltsfoot is a very tough plant that is more than capable of looking after itself. When well sited its roots will spread very freely sending up new shoots at some distance from the clump even if growing amongst dense weed competition[K]. This can make it a problem weed in gardens[200], so either choose your site with care or find some means of restraining it such as by planting in a large tub that is buried in the ground[K]. The rhizomes can lay dormant in the soil for many years, emerging when the soil is disturbed[200]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [2-1].

5.2.249 Crataegus monogyna

Hawthorn, Oneseed hawthorn

4 tlin 8 cyuc 3 kcaak 3 tcan 5 dwat m hkuc hmimhtut cyutli hgattcuphja7n hwicli hyishrasljutnyikfrip hpa7tli frusflatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Crataegus monogyna is a deciduous Shrub growing to 6 m (19ft) by 6 m (19ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to June, and the seeds ripen from September to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: Flowers Fruit LeavesEdible Uses: Coffee TeaFruit - raw or cooked[2, 12]. Not very appetizing raw[9, K], it is normally used for making jams and preserves[9, 183]. The fruit can be dried, ground, mixed with flour and used for making bread etc[46]. The fruit is about 1cm in diameter[200]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K]. Young shoots - raw[5, 177]. A pleasant nutty flavour[144], they are a good addition to the salad bowl[183]. A tea is made from the dried leaves[21, 46, 177, 183], it is a china tea substitute. The roasted seeds are a coffee substitute[12, 21, 46, 177]. The flowers are used in syrups and sweet puddings[183].

tcanta Fuel Hedge Hedge WoodA good hedge plant, it is very tolerant of being cut and of neglect and is able to regenerate if cut back severely, it makes a good thorny stock-proof

barrier[186] and resists very strong winds. It is often used in layered hedges[11, 29]. The cultivar 'Stricta' has made a very good hedge 3.5 metres tall in an exposed maritime position at Rosewarne in N. Cornwall[K]. Wood - very hard and tough, difficult to work. Used for tool handles etc. Valued in turning[7, 46, 61]. A good fuel, giving out a lot of heat[4].

dwatta Antispasmodic Astringent Cardiotonic Diuretic Hypotensive Malaria Sedative Tonic VasodilatorHawthorn is an extremely valuable medicinal herb. It is used mainly for treating disorders of the heart and circulation system, especially angina[254]. Western herbalists consider it a 'food for the heart', it increases the blood flow to the heart muscles and restores normal heart beat[254]. This effect is brought about by the presence of bioflavonoids in the fruit, these bioflavonoids are also strongly antioxidant, helping to prevent or reduce degeneration of the blood vessels[254]. The fruit is antispasmodic, cardiac, diuretic, sedative, tonic and vasodilator[4, 9, 21, 46, 165]. Both the fruits and flowers of hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222], they are also used to treat a heart muscle weakened by age, for inflammation of the heart muscle, arteriosclerosis and for nervous heart problems[21]. Prolonged use is necessary for the treatment to be efficacious[222]. It is normally used either as a tea or a tincture[222]. Hawthorn is combined with ginkgo (Ginkgo biloba) to enhance poor memory, working by improving the blood supply to the brain[254]. The bark is astringent and has been used in the treatment of malaria and other fevers[7]. The roots are said to stimulate the arteries of the heart[218].

nrakta Europe, including Britain, absent from Iceland, south and west the Mediterranean and Afghanistan ksacta Woods, hedges, thickets etc, on moist soils except wet peat and poor acid sands[9, 17].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Succeeds in all but the very poorest acid soils[186]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. A very hardy plant, tolerating temperatures down to at least -18°C[202]. Hybridizes freely with other members of this genus and with *C. laevigata* in the wild[186, 200]. There are many named forms selected for their ornamental value[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being trans-

planted[11]. In heavier shade they quickly become drawn and leggy, eventually dying[186]. An important food plant for the caterpillars of many lepidoptera species[30], there are 149 insect species associated with this tree[24]. Plants are susceptible to fireblight[200]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

5.2.250 Ribes missouriense

Missouri Gooseberry

4 tlin 8 cyuc 3 kcaak 0 tcan 0 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwattli xre7t hjonli

drutta Ribes missouriense is a deciduous Shrub growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[257]. A rich sub-acid vinous flavour that is very agreeable, the fruit is somewhat too acid to be eaten raw for most tastes but when fully ripe makes delicious tarts[183]. The fruit can be dried for later use[257]. A gooseberry, but with a smooth skin, it is about 10mm in diameter[200], though some forms can be up to 14mm in diameter[235].

nrakta Central N. America - Illinois to Minnesota, South Dakota, Kansas and Tennessee. ksacta Dry to moist open woods, thickets and fence rows[228].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. Stored seed requires 3 months cold stratification at between 0 and 5°C and should be sown as early in the year as possible[113, 164]. Under normal storage conditions the seed can remain viable for 17 years or more. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter, planting them out in late spring of the following year. Cuttings of half-ripe wood, 10 - 15cm with a heel, July/August in a frame[78, 113]. Cuttings of mature wood of the current year's growth, preferably with a heel of the previous year's growth, November to February in a cold frame or sheltered bed outdoors[78, 200].

nwatta Easily grown in a moisture retentive but well-drained loamy soil of at least moderate quality[11, 200]. Plants are quite tolerant of shade though do not fruit so well in such a position[11]. Hardy to about -20°C[200]. Plants can harbour a stage of 'white pine blister rust', so they should not be grown in the vicinity of pine trees[155]. Plants in this genus are notably susceptible to honey fungus[200]. Widely cultivated in temperate areas for its edible fruit, there are many named varieties[183]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

5.2.251 Fragaria chiloensis

Beach Strawberry, Pacific beach strawberry, Sandwich beach strawberry

4 tlin 10 cyuc 3 kcaak 3 tcan 1 dwat 0.3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwattli nyanhjen hjonli

drutta Fragaria chiloensis is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from April to May, and the seeds ripen from June to July. The species is dioecious (individual flowers are either male or female, but

cooked[105, 177, 183]. Used as they emerge from the ground in spring. The young leaves contain more than 200mg per 100g of vitamin C[218]. The seed is a good source of vitamin E, it can be ground and mixed with flour or added to other foods as a supplement[102, 183]. Be sure to remove the seed hairs[102]. The seed contains about 8% oil[218].

tcanta Essential Hedge Hedge Rootstock Soil stabilization TanninThe plant is fairly wind tolerant and can be grown as a shelter hedge though it can be damaged by salt laden winds[75]. The plant has a dense sturdy habit and makes an excellent hedge[245]. The root contains 23-25 per cent of tannin[266]. An essential oil obtained from the fresh flowers is used in the cosmetic industry[266]. The plant also has an extensive root system and is used for soil stabilization[11, 200]. This species can also be used as a rootstock for other species of rose, especially for ramblers and when grown on poor soils[11, 200].

dwatta Anodyne Antidote Astringent Cancer Carminative Diuretic Hypoglycaemic Laxative Poulitice Vitamin CThe leaves are poulticed and applied to sores[218]. The fruit is anodyne, diuretic, hypoglycaemic and laxative[218]. It is also antidotal to fish poisoning[218]. It is used to treat constipation and articular pain[279] and as an application to foul ulcers, wounds, sprains and injuries[240]. The seed is laxative and diuretic[218]. The root is rich in tannins. It is astringent and carminative[218]. The fruit of many members of this genus is a very rich source of vitamins and minerals, especially in vitamins A, C and E, flavanoids and other bio-active compounds. It is also a fairly good source of essential fatty acids, which is fairly unusual for a fruit. It is being investigated as a food that is capable of reducing the incidence of cancer and also as a means of halting or reversing the growth of cancers[214].

nrakta E. Asia - China, Japan, Korea. ksacta On slopes, in scrub, or by rivers at elevations around 1300 metres in China[266].

propta Seed. Rose seed often takes two years to germinate. This is because it may need a warm spell of weather after a cold spell in order to mature the embryo and reduce the seedcoat[80]. One possible way to reduce this time is to scarify the seed and then place it for 2 - 3 weeks in damp peat at a temperature of 27 - 32°C (by which time the seed should have imbibed). It is then kept at 3°C for the next 4 months by which time it should be starting to germinate[80]. Alternatively, it is possible that seed harvested 'green' (when it is fully developed but before it has dried on the plant) and sown immediately will germinate in the late winter. This method has not as yet(1988) been fully tested[80]. Seed sown as soon as it is ripe in a cold frame sometimes germinates in spring though it may take 18 months. Stored seed can be sown as early in the year as possible and stratified for 6 weeks at 5°C[200]. It may take 2 years to germinate[200]. Prick out the seedlings into individual pots when they are large enough to handle. Plant out in the summer if the plants are more than 25cm tall, otherwise grow on in a cold frame for the winter and plant out in late spring. Cuttings of half-ripe wood with a heel, July in a shaded frame. Overwinter the plants in the frame and plant out in late spring[78]. High percentage[78]. Cuttings of mature wood of the current seasons growth. Select pencil thick shoots in early autumn that are about 20 - 25cm long and plant them in a sheltered position outdoors or in a cold frame[78, 200]. The cuttings can take 12 months to establish but a high percentage of them normally succeed[78]. Division of suckers in the dormant season. Plant them out direct into their permanent positions. Layering. Takes 12 months[11].

nwatta Succeeds in most soils[11], preferring a circumneutral soil and a sunny position[200]. Grows well in heavy clay soils. Succeeds on poor soils[200]. Dislikes water-logged soils[200]. Grows well with alliums, parsley, mignonette and lupins[18, 20]. Garlic planted nearby can help protect the plant from disease and insect predation[18, 20]. Grows badly with boxwood[18]. A very ornamental plant[11], more than 100 blooms can be produced in a single cluster[245]. These flowers possess a delicious sweet fruity perfume[245]. Plants often self-layer[11]. Hybridizes freely with other members of this genus[80]. Plants in this genus are notably susceptible to honey fungus[200].

5.2.305 Petasites albus

Butterbur

4 tlin 8 cyuc 2 kcaak 0 tcan 1 dwat 0.6 m hkuc pcmhmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikliwis hpa7tmwattli nyanhjen hjonli

drutta Petasites albus is a PERENNIAL growing to 0.6 m (2ft) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to May, and the seeds ripen in May. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: StemEdible Uses: The small fleshy petioles (leaf stems) are very palatable when cooked and eaten like asparagus[7].

tcanta A good ground cover for the wilder areas of the garden[200]. It is too invasive to be used in small gardens and is only suitable for covering large areas[208]. The leaves were at one time used by peasants as a head covering[7].

dwatta Antitussive Emmenagogue Homeopathy Hypnotic Sedative VulneryThe root is emmenagogue, hypnotic, sedative and vulnerary[7, 172]. The ground or finely chopped rhizome has a healing effect when applied to slow-healing or weak ulcers, or to suppurating wounds[7]. An infusion of the leaves is a specific remedy for coughs[7]. A homeopathic remedy is made from the roots[7]. It is used in the treatment of wounds, ulcers etc[7].

nrakta N. and C. Europe. Naturalized in Britain. ksacta Waste ground, roadsides, plantations and woods[17], often in damp soils[1].

propta Seed - we have no information on this species but suggest sowing the seed in a cold frame as soon as it is ripe or in early spring. Only just cover the seed and do not allow the compost to dry out. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division succeeds at almost any time of the year. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Succeeds in ordinary garden soil[1], but prefers a deep fertile humus-rich soil that is permanently moist but not stagnant, succeeding in shade, semi-shade or full sun[200]. Prefers partial shade[31]. Prefers a heavy soil[208]. Plants can be grown in quite coarse grass, which can be cut annually in the autumn[233]. A very invasive plant, too rampant for anything other than the wild garden[187, 200]. Dioecious, male and female plants must be grown if seed is required.

5.2.306 Daucus pusillus

Rattlesnake Weed, American wild carrot

4 tlin 8 cyuc 2 kcaak 0 tcan 2 dwat 0.6 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwattli fyfcre7t hjonli

drutta Daucus pusillus is a BIENNIAL growing to 0.6 m (2ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. The seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies, beetles. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerate maritime exposure.

pcista Skin contact with the sap is said to cause photosensitivity and/or dermatitis in some people[218].

kcakta Edible Parts: RootEdible Uses: Root - raw or cooked[46, 61, 105, 161, 257].

dwatta Antipruritic Blood purifier Febrifuge PouliticeThe plant is antipruritic, blood purifier and febrifuge[257]. A

way as arrowroot[4]. Rich in mucilage, it forms a soothing and demulcent jelly that is used in the treatment of irritations of the gastro-intestinal canal[4]. One part of salep to fifty parts of water is sufficient to make a jelly[4]. The tuber, from which salep is prepared, should be harvested as the plant dies down after flowering and setting seed[4].

nrakta Europe, including Britain, from Scandanavia south and east to Spain, Siberia and W Asia. ksacta Grassy hills, banks, borders of fields and woodland edges on chalky soils[17]. Extremely rare in Britain, growing in only one or two sites[135].

propta Seed - surface sow, preferably as soon as it is ripe, in the greenhouse and do not allow the compost to dry out. The seed of this species is extremely simple, it has a minute embryo surrounded by a single layer of protective cells. It contains very little food reserves and depends upon a symbiotic relationship with a species of soil-dwelling fungus. The fungal hyphae invade the seed and enter the cells of the embryo. The orchid soon begins to digest the fungal tissue and this acts as a food supply for the plant until it is able to obtain nutrients from decaying material in the soil[200]. It is best to use some of the soil that is growing around established plants in order to introduce the fungus, or to sow the seed around a plant of the same species and allow the seedlings to grow on until they are large enough to move. Division of the tubers as the flowers fade[230]. This species produces a new tuber towards the end of its growing season. If this is removed from the plant as its flowers are fading, the shock to the plant can stimulate new tubers to be formed. The tuber should be treated as being dormant, whilst the remaining plant should be encouraged to continue in growth in order to give it time to produce new tubers[230]. Division can also be carried out when the plant has a fully developed rosette of leaves but before it comes into flower[230]. The entire new growth is removed from the old tuber from which it has arisen and is potted up, the cut being made towards the bottom of the stem but leaving one or two roots still attached to the old tuber. This can often be done without digging up the plant. The old tuber should develop one or two new growths, whilst the new rosette should continue in growth and flower normally[230].

nwatta Easily grown on a good loamy soil[42]. Requires a deep rich soil[1]. Prefers a chalky soil[42]. Orchids are, in general, shallow-rooting plants of well-drained low-fertility soils. Their symbiotic relationship with a fungus in the soil allows them to obtain sufficient nutrients and be able to compete successfully with other plants. They are very sensitive to the addition of fertilizers or fungicides since these can harm the symbiotic fungus and thus kill the orchid[230]. This symbiotic relationship makes them very difficult to cultivate, though they will sometimes appear uninvited in a garden and will then thrive. Transplanting can damage the relationship and plants might also thrive for a few years and then disappear, suggesting that they might be short-lived perennials[230]. Cultivated plants often survive for many years, though they rarely multiply[230]. Plants can succeed in a lawn in various parts of the country. The lawn should not be mown early in the year before or immediately after flowering[200]. Plant out bulbs whilst the plant is dormant, preferably in the autumn[200]. Bulbs can also be transplanted with a large ball of soil around the roots when they are in leaf, they are impatient of root disturbance[1]. Plants seem to be immune to the predations of rabbits[233].

5.2.303 Dianthus superbus

Fringed Pink
4 tin 8 cyuc 2 kcaak 0 tcan 3 dwat 0.6 m hkuc
hmimhtut cyutli kyucucup hwicli hrasljutnyik hpa7tli flat-prikliwslip hpa7tmwatli xre7t hjonli

drutta Dianthus superbus is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from June to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista The plant contains saponins but apparently in quantities too low to cause harm[179]. Although fairly toxic, saponins are poorly absorbed by the body and most pass straight through without harm. Saponins are found in many foods, such as beans. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K].

kcakta Edible Parts: Flowers Leaves NectarEdible Uses: The leaves, stems and tops are boiled, steeped in water and eaten as a potherb[105, 177, 179, 183]. Young plants are also eaten[183]. One report says that they contain saponins but that the leaves are apparently not toxic[179]. Probably this is because the content of saponins is too low to be harmful[K]. Children suck the flowers for their sweet edible nectar[105, 177, 183].

dwatta Abortifacient Antibacterial Astringent Contra-ceptive Diuretic Emmenagogue Febrifuge Haemostatic Ophthalmic Resolvent Tonic Urinary VulneraryThe fringed pink, called Qu Mai in Chinese herbalism, has been used in Chinese herbal medicine for over 2,000 years. The whole plant is a bitter tonic herb that stimulates the digestive and urinary system, and also the bowels[238]. It also lowers blood pressure, reduces fevers and controls bacterial infections[218, 238]. Little used on its own, it is often taken with Dan Shen (Salvia multiorrhiza) to induce menstruation[254]. The closely related D. chinensis has the same uses as Qu Mai and is more commonly used[238]. The plant is abortifacient, contraceptive, diuretic, emmenagogue, ophthalmic, tonic and vulnerary[147, 176, 178, 218]. It is said to promote hair growth[147, 176, 178]. It is ranked 9th in a list of 250 potential antifertility Chinese plants[218]. The plant is taken internally in the treatment of acute urinary tract infections (especially cystitis), urinary stones, constipation and failure to menstruate[238]. Externally, it is applied to skin inflammations and swellings[238]. The leaves are used in the treatment of haemorrhoids, lumbricoid worms, venereal sores etc[218]. The flowers are astringent, diuretic, haemostatic, resolvent and vulnerary[218]. Research has shown that the flowers are the most markedly diuretic part of the plant[254].

nrakta Europe to N. Asia. ksacta Woody hills and dry meadows[100].

propta Seed - sow April/June in a greenhouse and only just cover the seed. Germination usually takes place within 1 - 3 weeks at 20°C. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the autumn.

nwatta Prefers an alkaline soil but tolerates slightly acid soils[200]. Succeeds in any well-drained peaty soil in sun or light shade[187]. Plants succeed when grown on the top of a broad or retaining wall[219]. A very hardy plant, tolerating temperatures down to about -20°C[187]. The flowers have a soft sweet perfume[245].

5.2.304 Rosa multiflora

Japanese Rose, Multiflora rose
4 tin 8 cyuc 2 kcaak 0 tcan 2 dwat m hkuc
hmimhtut cyutli tcup hwicli hyishrasljutnyikfrp hpa7tli flat-prikliwis hpa7tmwatli xre7t hjonli

drutta Rosa multiflora is a deciduous Shrub growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to July, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

pcista There is a layer of hairs around the seeds just beneath the flesh of the fruit. These hairs can cause irritation to the mouth and digestive tract if ingested.

kcakta Edible Parts: Fruit Seed StemEdible Uses: Fruit - raw or made into preserves, pies etc[105, 177, 183]. The fruit is about 7mm in diameter[200], but there is only a thin layer of flesh surrounding the many seeds[K]. The fruit is rich in carotene (81.4mg per 100g) and vitamin C[218]. Some care has to be taken when eating this fruit, see the notes above on known hazards. Young leaves and shoots - raw or

only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

kcakta Edible Parts: FruitEdible Uses: TeaFruit - raw or cooked[2, 27, 101, 183, 257]. Large, sweet and succulent with a delicate flavour[183]. A delicious treat[K]. The berries can be used to make jams, preserves etc[257]. A tea can be made from the leaves[257].

tcanta Plants spread by means of runners and can be grown as a ground cover[208]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch. seedy fruit loved by birds. Perennial groundcover for zone 2 firebreaks. The US government has created a system of firebreaks for areas prone to wildfires, these are separated into concentric zones surrounding buildings. Zone 2 is the second away from the house. These low-level ground covers provide little fuel.

dwatta Antiseptic Astringent Emmenagogue Galactogogue OdontalgicThe plant is antiseptic, astringent, emmenagogue, galactogogue and odontalgic[172]. It has been used to regulate the menstrual cycle[172]. A poultice of the chewed leaves has been used to treat burns[257].

nrakta S. America to N. America. ksacta Grows in scrub near the coast from Chile to western N. America[71].

propta Seed - sow early spring in a greenhouse. The seed can take 4 weeks or more to germinate. The seedlings are very small and slow-growing at first, but then grow rapidly. Prick them out into individual pots when they are large enough to handle and plant them out during the summer. Division of runners, preferably done in July/August in order to allow the plants to become established for the following years crop[200]. They can also be moved in the following spring if required, though should not then be allowed to fruit in their first year. The runners can be planted out direct into their permanent positions.

nwatta Prefers a fertile, well-drained, moisture retentive soil in a sunny position[27, 200]. Tolerates semi-shade though fruit production will be reduced. Grows best near the coast[27]. Plants like a mulch of pine or spruce leaves[18]. Cultivated for its edible fruit in the Andes[61]. This species, along with F. virginiana, is probably a parent of the cultivated strawberries[46]. Dioecious. Male and female plants must be grown if seed is required. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. An evergreen. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2]. Heat zone 9-1. Can be mown in early spring.

5.2.252 Hydrophyllum virginianum

Virginia Waterleaf, Eastern waterleaf
4 tin 8 cyuc 3 kcaak 0 tcan 1 dwat 0.6 m hkuc
hmim cyutli tcup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Hydrophyllum virginianum is a PERENNIAL growing to 0.6 m (2ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in May, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked[2, 61]. A bland flavour[159]. The mild-tasting and tender young leaves make a pleasant addition to the salad bowl[183, K], whilst older leaves make a good spinach[183]. Only use when young, they become bitter with age[159].

dwatta Astringent DysenteryA tea made from the roots is astringent, it is used in the treatment of diarrhoea, dysen-

tery etc[222]. A decoction, or the chewed root, has been used as a wash for cracked lips and sore mouths[257].

nrakta Eastern N. America - Quebec and New England to Virginia, west to Tennessee and Kansas. ksacta Rich woods and damp clearings[43].

propta Seed - best sown as soon as it is ripe in a cold frame. The seed usually germinates in early spring. Sow stored seed as early in the year as possible. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring or autumn[200]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Requires a moist humus-rich soil in semi-shade[200]. Slugs are particularly fond of this plant and will soon destroy it if given a chance[K]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

5.2.253 Vitis mustangensis

Mustang Grape
4 tin 8 cyuc 3 kcaak 0 tcan 0 dwat m hkuc
hmimhtut cyutli kyucucup hwicli hrasljutnyik hpa7tli flat-prikliwis hpa7tmwatli xre7t hjonli

drutta Vitis mustangensis is a deciduous Climber growing to 10 m (32ft 10in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to July, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit - raw, cooked or dried for winter use[105, 161, 177]. Tough skinned, they are used mainly for pies and jellies[183].A disagreeable flavour[11, 200]. The fruit is about 16mm in diameter[200] and is borne in bunches. Young leaves are wrapped around other foods and then baked, they impart a pleasant flavour. Young tendrils - raw or cooked.

tcanta DyeA yellow dye is obtained from the fresh or dried leaves[168].

nrakta Southern N. America - Oklahoma and Arkansas to Texas. ksacta Rich damp woodland soils[200], often on limestone[11].

propta Seed - best sown in a cold frame as soon as it is ripe[K]. Six weeks cold stratification improves the germination rate, and so stored seed is best sown in a cold frame as soon as it is obtained. Germination should take place in the first spring, but sometimes takes another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant out in early summer. Cuttings of mature wood of the current seasons growth, December/January in a frame. These cuttings can be of wood 15 - 30cm long or they can be of short sections of the stem about 5cm long with just one bud at the top of the section. In this case a thin, narrow strip of the bark about 3cm long is removed from the bottom half of the side of the stem. This will encourage callusing and the formation of roots. Due to the size of these cuttings they need to be kept in a more protected environment than the longer cuttings. Layering.

nwatta Prefers a deep rich moist well-drained moderately fertile loam[1, 200]. Grows best in a calcareous soil[200]. Succeeds in sun or partial shade though a warm sunny position is required for the fruit to ripen[200]. Plants climb by means of tendrils[182]. Any pruning should be carried out in winter when the plants are dormant otherwise they bleed profusely[182, 200]. Plants in this genus are notably susceptible to honey fungus[200].

5.2.254 Muscari comosum

Tassel Hyacinth, Tassel grape hyacinth
4 tlin 8 cyuc 3 kcaak 2 tcan 1 dwat 0.5 m hkuc
hmimhtut cyutli kyucup hwicli hrasjlutnyik hpa7tli flat-prikliwis hpa7tmwatli fyifxre7t hjonli

drutta Muscari comosum is a BULB growing to 0.5 m (1ft 8in) by 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from May to July, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: RootEdible Uses: Bulb - cooked[22, 61, 183]. It is about 35mm in diameter[200]. A slightly bitter taste[7] that is appreciated by certain ethnic groups, especially Greeks and Italians[183]. Used in spring[46, 177]. The cooked bulbs, preserved in oil, are used as a relish[183]. tcanta Landscape Uses: Border, Container, Massing, Rock garden, Specimen, forest garden.

dwatta Appetizer Diuretic PoulticeThe bulb is appetizer and diuretic[7, 183]. The bulb is rich in mucilage and can be crushed then applied as a poultice to reddened skin[7].

nrakta Europe. A frequent casual, rarely naturalized in Britain[17]. ksacta Hedgerows, edges of fields, woods and in short grass on dry soils[7, 50].

propta Seed - best sown as soon as ripe in a greenhouse[200]. The seed can also be sown in early spring in a greenhouse. A good proportion of the seed usually germinates within 2 - 3 months. Sow the seed thinly so that the seedlings can be left undisturbed in the pot for their first year of growth. Give them an occasional liquid feed in the growing season to ensure they do not become nutrient deficient. When the plants become dormant in late summer, pot up the small bulbs placing 2 - 3 bulbs in each pot. Grow them on for another one or two years in the greenhouse before planting them out when they are dormant in late summer. If you have sufficient seed then it is worthwhile trying sowing it in situ outdoors in early spring. This is rather a hit and miss method, but a lot less work than indoor sowing. Division of offsets in July/August after the leaves die down[1]. It can be done every other year if a quick increase is required[1]. Larger bulbs can be replanted direct into their permanent positions, but it is best to pot up the smaller bulbs and grow them on in a cold frame for a year before planting them out when they are dormant in late summer.

nwatta Prefers a rich open well-drained soil[1]. Succeeds in any soil and situation[1, 42]. Does very well in short grass[1], increasing freely and it can become invasive[200]. The flowers have a pleasing perfume[245]. There is at least one named form, selected for its ornamental value[200].

5.2.255 Tragopogon porrifolius

Salsify
4 tlin 8 cyuc 3 kcaak 0 tcan 2 dwat 0.6 m hkuc
htut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Tragopogon porrifolius is a BIENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

kcakta Edible Parts: Flowers Leaves Root Seed StemEdible Uses: GumRoot - raw or cooked[2, 5, 27, 33, 37, 89]. The young root can be grated in salads[12], older roots are best cooked[183]. The flavour is mild and sweet, and is said to resemble oysters[183, K]. The roots are harvested as required from October until early spring, or can be harvested in late autumn and stored until required[4]. Young shoots - raw or cooked[2, 12, 27, 33, 37, 52, 183]. The new growth is used in spring. A sweet taste[200]. Flowering shoots -

raw or cooked[200]. Used like asparagus. Flowers - raw. Added to salads[183]. The sprouted seeds can be added to salads or sandwiches[183]. The root latex is used as a chewing gum[61, 105, 161, 183].

dwatta Antibilious Aperient Deobstruent DiureticSalsify is a cleansing food with a beneficial effect upon the liver and gallbladder[254]. The root is antibilious, slightly aperient, deobstruent and diuretic[4, 21]. It is specific in the treatment of obstructions of the gall bladder and jaundice[240] and is also used in the treatment of arteriosclerosis and high blood pressure[254].

nrakta Europe - Mediterranean. Naturalized in Britain[17]. ksacta Found near the sea and estuaries in S.E. England[17].

propta Seed - sow in situ as early in the year as possible, in March if weather conditions permit[4]. Seed sowings often fail unless the soil is kept moist until the seedlings are growing well[4].

nwatta Succeeds in ordinary garden soils, including heavy clays[4, 200]. Plants do not grow well in stony soils[4]. Prefers an open situation[37] and a cool moist root run[14, 20]. Salsify is occasionally cultivated in the garden for its edible root[2, 89], there are some named varieties[183]. Grows well with mustard[20].

5.2.256 Prunus japonica nakai

Japanese Plum
4 tlin 8 cyuc 3 kcaak 1 tcan 3 dwat 0.5 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Prunus japonica nakai is an evergreen Shrub growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in May, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: Fruit SeedEdible Uses: Fruit - raw or cooked. A sweet agreeable flavour, they make a good pie[183]. A very good size, about 50mm in diameter with one large seed[200]. Seed - raw or cooked. Do not eat the seed if it is too bitter - see the notes above on toxicity.

tcanta DyeA green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168].

dwatta Aperient Aphrodisiac Carminative Demulcent Deobstruent Diuretic Lentive OphthalmicThe kernels are aperient, carminative, demulcent, deobstruent, diuretic, lenitive and ophthalmic[147, 176, 178, 218, 279]. Their use lowers the blood pressure[176]. A decoction is used in the treatment of sluggish colon, constipation, oedema and inadequate elimination of urine[147]. The pits of this subspecies are aphrodisiac for both sexes[218]. The root is used in the treatment of constipation, children's fever, pinworms and teeth ailments[218]. All members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta E. Asia - China, Korea, Manchuria. ksacta Open country and roadsides[151]. Sunny mountain slopes at elevations of 100 - 200 metres[266].

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200].

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

kcakta Edible Parts: RootEdible Uses: Bulb - cooked[2, 14, 61]. It is often dried for later use[46]. Rich in starch, it can be used as a vegetable in similar ways to potatoes (*Solanum tuberosum*).

dwatta Cardiac Diuretic Emmenagogue Emollient ExpectorantThe bulb is diuretic, emmenagogue, emollient and expectorant[240]. They are used to relieve heart diseases, pain in the cardiac region and angina pectoris[240].

nrakta Europe to W. Asia. Naturalized in Britain. ksacta Deciduous woods, scrub and mountain pasture, especially on limestone[13].

propta Seed - delayed hypogeal germination[130]. Best sown as soon as it is ripe in a cold frame, it should germinate in spring[143]. Stored seed will require a warm/cold/warm cycle of stratification, each period being about 2 months long[163]. Grow on in cool shady conditions. Great care should be taken in pricking out the young seedlings, many people leave them in the seed pot until they die down at the end of their second years growth. This necessitates sowing the seed thinly and using a reasonably fertile sowing medium. The plants will also require regular feeding when in growth. Divide the young bulbs when they are dormant, putting 2 - 3 in each pot, and grow them on for at least another year before planting them out into their permanent positions when the plants are dormant[K]. Division with care in the autumn once the leaves have died down. Replant immediately[200]. Bulb scales can be removed from the bulbs in early autumn. If they are kept in a warm dark place in a bag of moist peat, they will produce bulblets. These bulblets can be potted up and grown on in the greenhouse until they are large enough to plant out[200].

nwatta Landscape Uses:Border, Container, Massing, Seashore, Specimen, Woodland garden. Succeeds in ordinary well-drained garden soil[1, 42]. Prefers a good leafy soil in sun or semi-shade[90]. Prefers its roots to be in the shade[28]. Prefers a calcareous soil according to some reports[1, 4, 13, 90], whilst one says that it is probably best in an acid or neutral soil[47]. A very ornamental[1] and polymorphic plant[143]. It takes 7 - 8 years to flower from seed[143]. The flowers have an unpleasant odour[143]. The flowers are sweetly fragrant, especially at night in order to attract the night hawk-moth for pollination[245]. Early to mid autumn is the best time to plant out the bulbs in cool temperate areas, in warmer areas they can be planted out as late as late autumn[200]. The plant should be protected against rabbits and slugs in early spring. If the shoot tip is eaten out the bulb will not grow in that year and will lose vigour[200]. Special Features:Naturalizing, Attracts butterflies, Suitable for cut flowers, Fragrant flowers.

5.2.301 Quercus shumardii

Shumard Oak, Schneck oak
4 tlin 8 cyuc 2 kcaak 0 tcan 2 dwat 30 m hkuc
hmimhtut cyutli tcup hwicli jlutnyik hpa7tli flatprikliwis hpa7tmwatli hjonli

drutta Quercus shumardii is a deciduous Tree growing to 30 m (98ft 5in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to May, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: CoffeeSeed - cooked. Up to 25mm long and wide[227], it can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed contains bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream.

Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute.

tcanta Repellent Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. Wood - heavy, hard, strong, close grained[82, 149, 227]. It weighs 57lb per cubic foot[227]. A very valuable timber, it is used for lumber, flooring, furniture, veneers, cabinet making etc[82, 149, 229].

dwatta Astringent DysenteryAny galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta South-eastern N. America - Michigan to Florida and west to Texas. ksacta Borders of streams and swamps in rich moist soils[82]. Usually found in clay soils[227].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. Prefers warmer summers than are usually experienced in Britain, trees often grow poorly in this country and fail to properly ripen their wood resulting in frost damage overwinter[200]. A moderately fast-growing tree in the wild, it commences bearing seeds when about 25 years old[229]. Seed production is cyclic, a year of high yields being followed by 1 - 3 years of low yields[229]. The tree flowers on new growth produced in spring, the seed taking two summers to ripen[229]. Plants in the wild are very susceptible to the disease 'oak wilt'[274]. Closely related to *Q. rubra* and *Q. coccinea*[11]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200].

5.2.302 Orchis militaris

Military Orchis
4 tlin 8 cyuc 2 kcaak 0 tcan 2 dwat m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli lwissliip hpa7tmwatli xre7t hjonli

drutta Orchis militaris is a BULB growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: DrinkRoot - cooked[2, 4, 46]. It is a source of 'salep', a fine white to yellowish-white powder that is obtained by drying the tuber and grinding it into a powder[2, 105, 177]. Salep is a starch-like substance with a sweetish taste and a faint somewhat unpleasant smell[4]. It is said to be very nutritious and is made into a drink or can be added to cereals and used in making bread etc[100, 183]. One ounce of salep is said to be enough to sustain a person for a day[100, 115].

dwatta Demulcent NutritiveSalep (see above for more details) is very nutritive and demulcent[4]. It has been used as a diet of special value for children and convalescents, being boiled with water, flavoured and prepared in the same

percentage[78]. Cuttings of mature wood of the current season's growth, 15-20cm with or without a heel, November in a cold frame. Good percentage[78]. Layering in autumn[200].

nwatta Prefers a good moist soil with its roots in the shade and its top climbing into the light[200]. Succeeds in any soil in part shade[184]. Established plants are drought tolerant[190]. They succeed in dry shade, the cultivar 'Halliana' is especially recommended for such a situation[188]. Plants are hardy to about -20°C[184]. The foliage can be damaged in severe wind-chill conditions but the plant usually recovers in the spring[202]. Fruit is only formed after a hot summer[202]. A rampantly growing plant[190], it climbs by twining around other plants[182] and makes an excellent screen for a north or east facing fence or an unsightly object[190]. This species has the potential to become a rampant weed, it has escaped from cultivation in N. America where it can outcompete native species[274]. The plant has powerfully scented flowers. The white-flowered cultivar 'Halliana' has a pronounced lemon-like perfume[245]. There are several named varieties, developed for their ornamental value[182, 200]. Special Features:Not North American native, Invasive, Naturalizing, Fragrant flowers, Attractive flowers or blooms.

5.2.298 Rosa rubiginosa

Sweet Briar, Sweetbriar rose

4 tlin 8 cyuc 2 kcaak 0 tcan 3 dwat 2.5 m hkuc
hmimhtut cyutli tcup hwicli hrasljutnykifrip hpa7tli flatprikliw
wisslip hpa7tmwatli fyifxre7t hjonli

drutta Rosa rubiginosa is a deciduous Shrub growing to 2.5 m (8ft) by 2.5 m (8ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from June to July, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista There is a layer of hairs around the seeds just beneath the flesh of the fruit. These hairs can cause irritation to the mouth and digestive tract if ingested.

kcakta Edible Parts: Flowers Fruit Seed StemEdible Uses: TeaFruit - cooked[2, 62]. It is used in making jellies etc[105, 183]. The taste is best after a frost[172]. The fruit is up to 25mm in diameter[200], but there is only a thin layer of flesh surrounding the many seeds[K]. Some care has to be taken when eating this fruit, see the notes above on known hazards. A pleasant tasting fruity-flavoured tea is made from the fruit, it is rich in vitamin C[21]. Petals - raw or cooked. Remove the bitter white base[172]. Used in confectionery[177, 183]. Young shoots - raw[172]. Used as they come through the ground in spring. The seed is a good source of vitamin E, it can be ground into a powder and mixed with flour or added to other foods as a supplement[102, 183]. Be sure to remove the seed hairs[102].

tcanta Hedge HedgeThe plant makes a good low hedge[1, 11]. The prickles on the stem make it a useful security hedge[245].

dwatta Aperient Astringent Cancer Skin Stomachic Vitamin CThe flowers and hips are aried, astringent and stomachic[21, 46]. An infusion of dried rose petals can be used to treat headaches and dizziness, with honey added the infusion is used as a heart and nerve tonic and a blood purifier[21]. A decoction of the petals is used to treat mouth sores[21]. The seed is rich in vitamin E and an oil extracted from the seed is used externally in the treatment of burns, scars and wrinkles[238]. The fruit of many members of this genus is a rich source of vitamins and minerals, especially in vitamins A, C and E, flavanoids and other bio-active compounds. It is also a fairly good source of essential fatty acids, which is fairly unusual for a fruit. It is being investigated as a food that is capable of reducing the incidence of cancer and also as a means of halting or reversing the growth of cancers[214].

nrakta Europe, including Britain, from Scandanavia south and east to Spain, the Caucasus and Himalayas. ksacta Open copses and old hedgerows[4]. Usually found on

calcareous soils, it is one of the first shrubs to colonize chalk grassland[11, 17].

propta Seed. Rose seed often takes two years to germinate. This is because it may need a warm spell of weather after a cold spell in order to mature the embryo and reduce the seedcoat[80]. One possible way to reduce this time is to scarify the seed and then place it for 2-3 weeks in damp peat at a temperature of 27-32°C (by which time the seed should have imbibed). It is then kept at 3°C for the next 4 months by which time it should be starting to germinate[80]. Alternatively, it is possible that seed harvested 'green' (when it is fully developed but before it has dried on the plant) and sown immediately will germinate in the late winter. This method has not as yet(1988) been fully tested[80]. Seed sown as soon as it is ripe in a cold frame sometimes germinates in spring though it may take 18 months. Stored seed can be sown as early in the year as possible and stratified for 6 weeks at 5°C[200]. It may take 2 years to germinate[200]. Prick out the seedlings into individual pots when they are large enough to handle. Plant out in the summer if the plants are more than 25cm tall, otherwise grow on in a cold frame for the winter and plant out in late spring.Cuttings of half-ripe wood with a heel, July in a shaded frame. Overwinter the plants in the frame and plant out in late spring[78]. High percentage[78]. Cuttings of mature wood of the current seasons growth. Select pencil thick shoots in early autumn that are about 20-25cm long and plant them in a sheltered position outdoors or in a cold frame[78, 200]. The cuttings can take 12 months to establish but a high percentage of them normally succeed[78]. Division of suckers in the dormant season. Plant them out direct into their permanent positions. Layering. Takes 12 months[11].

nwatta Succeeds in most soils[11], preferring a circum-neutral soil and a sunny position[14, 200]. Grows well in heavy clay soils. Dislikes water-logged soils[200]. Grows well with alliums, parsley, mignonette and lupins[18, 20]. Garlic planted nearby can help protect the plant from disease and insect predation[18, 20]. Grows badly with boxwood[18]. Grows well on chalk. A very ornamental plant[1]. The leaves are apple-scented[188]. The flowers are slightly scented[245]. Hybridizes freely with other members of this genus[80]. Plants in this genus are notably susceptible to honey fungus[200].

5.2.299 Tragopogon crocifolius

4 tlin 8 cyuc 2 kcaak 0 tcan 0 dwat 0.8 m hkuc
htut cyutli tcup hwicli hrasljutnykifrip hpa7tli flatprikliw
hpa7tmwatli xre7t hjonli

drutta Tragopogon crocifolius is a ANNUAL/BIENNIAL growing to 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Leaves RootEdible Uses: Root-cooked[2, 177]. Leaves - raw or cooked[105].

nrakta S. Europe - Italy. ksacta Cultivated land and stony ground in the mountains[45].

propta Seed - sow spring in situ. Make sure to water the seed in if the weather is dry.

nwatta Succeeds in ordinary garden soils, including heavy clays[200].

5.2.300 Lilium martagon

Turk's Cap Lily, Martagon lily

4 tlin 8 cyuc 2 kcaak 0 tcan 1 dwat m hkuc
hmimhtut cyutli tcup hwicli hrasljutnykifrip hpa7tli flatprikliw
hpa7tmwatli fyifxre7t hjonli

drutta Lilium martagon is a BULB growing to 1.2 m (4ft) by 0.3 m (1ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from June to July, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and

Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200]. Softwood cuttings from strongly growing plants in spring to early summer in a frame[200]. Layering in spring.

nwatta Thrives in a well-drained moisture-retentive loamy soil[11, 200]. Prefers some lime in the soil but is likely to become chlorotic if too much lime is present[1]. Succeeds in sun or partial shade though it fruits better in a sunny position[11, 200]. A very ornamental plant[1], but it is subject to die-back[11]. Plants in this genus are notably susceptible to honey fungus[200]. This sub-species has larger plum-like fruits up to 50mm in diameter[200]. Closely related to *P. glandulosula*[11, 58]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A clumping plant, forming a colony from shoots away from the crown but with a limited spread [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2].

5.2.257 Physalis pruinosa

Strawberry Tomato

4 tlin 8 cyuc 3 kcaak 0 tcan 0 dwat 0.6 m hkuc
hmimhtut cyutli kyuctcup hwicli hrasljutnykifrip hpa7tli flatprikliw hpa7tmwatli xre7t hjonli

drutta Physalis pruinosa is a ANNUAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista All parts of the plant, except the fruit, are poisonous[19, 65].

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked in pies, preserves etc[105]. A delicious bitter sweet flavour. The plant conveniently wraps up each fruit in its own 'paper bag' (botanically, the calyx) to protect it from pests and the elements. This calyx is toxic and should not be eaten.

nrakta Eastern N. America - Wisconsin, New York and south to Florida. ksacta Dry open often sandy soils, old fields and wasteland[43].

propta Seed - sow March/April in a greenhouse only just covering the seed. Germination usually takes place quickly and freely. Prick out the seedlings into individual pots of fairly rich soil when they are large enough to handle and plant them out after the last expected frosts. Consider giving them some protection such as a cloche until they are growing away well. Diurnal temperature fluctuations assist germination[170].

nwatta Succeeds in any well-drained soil in full sun or light shade[200]. The young growth in spring can be damaged by late frosts. Occasionally cultivated for its edible fruit, there are some named varieties. Similar to *P. peruviana*[200].

5.2.258 Yucca angustissima

Narrowleaf yucca, Kanab yucca, Toft's yucca, Yucca
4 tlin 9 cyuc 3 kcaak 4 tcan 0 dwat 0.4 m hkuc
hmimhtut cyutli hgatkyuctcup hwicli hyshrasljutnykifrip hpa7tli flatprikliw hpa7tmwatli xre7t hjonli

drutta Yucca angustissima is an evergreen Shrub growing to 0.4 m (1ft 4in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Hand. Suitable for: light (sandy), medium (loamy) and heavy (clay)

soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure.

pcista The roots contain saponins[222]. Whilst saponins are quite toxic to people, they are poorly absorbed by the body and so tend to pass straight through. They are also destroyed by prolonged heat, such as slow baking in an oven. Saponins are found in many common foods such as beans[K]. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K].

kcakta Edible Parts: Flowers Fruit StemEdible Uses: Fruit - the immature fruit is cooked[85]. Baked in an oven[216]. A bitter taste, the bitterness is in the skin[85]. The fruit is about 6cm long and 2.5cm wide[200]. Flowers - raw or cooked. They are delicious raw, or can be dried, crushed and used as a flavouring[85]. Flowering stem - peeled, cooked and used like asparagus. The whitish inner portion is used[85].

tcanta Basketry Broom Brush Fibre SoapA fibre obtained from the leaves is used for making ropes, baskets and mats[85]. The leaves are very fibrous and can be used as paint brushes[92] or as a broom or woven to make mats etc[85]. They are also used in basketry[216]. The roots are rich in saponins and can be used as a soap substitute[85, 216].

nrakta South-western N. America. ksacta Sandy places, sandstone outcrops, rocky hillsides of deserts at elevations of 900-2200 metres in Arizona, New Mexico and Utah[270]. Prota Seed - sow spring in a greenhouse. Pre-soaking the seed for 24 hours in warm water may reduce the germination time. It usually germinates within 1-12 months if kept at a temperature of 20°C. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse or cold frame for at least their first two winters. Plant them out into their permanent positions in early summer and consider giving them some winter protection for at least their first winter outdoors - a simple pane of glass is usually sufficient[K]. Seed is not produced in Britain unless the flowers are hand pollinated. Root cuttings in late winter or early spring. Lift in April/May and remove small buds from base of stem and rhizomes. Dip in dry wood ashes to stop any bleeding and plant in a sandy soil in pots in a greenhouse until established[78].

nwatta Landscape Uses:Border, Massing, Specimen. Thrives in any soil but prefers a sandy loam and full exposure to the south[11]. Plants can succeed in light shade[K]. They are harder when grown on poor sandy soils[200]. Established plants are very drought resistant, this species is also tolerant of damp weather[11]. Plants are not hardy in the colder areas of the country, they tolerate temperatures down to about -10° if in a suitable location[11, 200]. Closely allied to *Y. glauca*[11]. The plant has a thick prostrate rootstock[11]. In the plants native environment, its flowers can only be pollinated by a certain species of moth. This moth cannot live in Britain and, if fruit and seed is required, hand pollination is necessary. This can be quite easily and successfully done using something like a small paint brush. Individual crowns are monocarpic, dying after flowering[233]. However, the crown will usually produce a number of sideshoots before it dies and these will grow on to flower in later years[233]. Plants in this genus are notably resistant to honey fungus[200]. Members of this genus seem to be immune to the predations of rabbits[233]. Special Features:North American native, Fragrant flowers, Attractive flowers or blooms.

5.2.259 Juglans mandschurica

Manchurian Walnut

4 tlin 8 cyuc 3 kcaak 0 tcan 1 dwat m hkuc
htut cyutli tcup hwicli hrasljutnykifrip hpa7tli flatprikliw
hpa7tmwatli fyif hjonli

drutta Juglans mandschurica is a deciduous Tree growing to 20 m (65ft 7in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to June, and the seeds ripen from September to October. The species

is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Oil Oil Seed**Edible Uses:** Oil OilSeed - raw or roasted[183]. The kernels are well filled but difficult to extract because the shell is thick[74, 117, 183]. An edible oil is obtained from the seed[105, 183], it tends to go rancid quickly.

tcanta Herbicide Miscellany Oil Oil Rootstock String WoodThe seed contains up to 52% oil and, as well as being edible, it has industrial uses[74]. A rope is made from the bark of young trees[74]. Plants produce chemicals which can inhibit the growth of other plants. These chemicals are dissolved out of the leaves when it rains and are washed down to the ground below, reducing the growth of plants under the tree[18, 20, 159]. The roots of many members of this genus produce substances that are toxic to many plant species, especially apples (*Malus* species), members of the Ericaceae, *Potentilla* spp and the white pines (certain *Pinus* spp.)[200]. The inner bark is used to make heel pieces for straw shoes[151]. Sometimes used as a rootstock to confer greater cold resistance[183]. Wood - hard, durable. Used for veneer, furniture etc[46, 61, 74].

dwatta Cancer MiscellanyThe cotyledons are said to be a cure for cancer[218].

nrakta E. Asia - Manchuria. **ksacta Mixed woods in rich soils, also by mountain streams**[74]. Mixed forests on mountain slopes or in valleys at elevations of 500 - 2800 metres[266].

propta The seed is best sown as soon as it is ripe in individual deep pots in a cold frame[80]. You need to protect it from mice, birds, squirrels etc. The seed usually germinates in late winter or the spring. Plant out the seedlings into their permanent positions in early summer and give some protection from the cold for their first winter or two. The seed can also be stored in cool moist conditions (such as the salad compartment of a fridge) over the winter and sown in early spring but it may then require a period of cold stratification before it will germinate[78, 80, 113].

nwatta Requires a deep well-drained loam and a sunny position sheltered from strong winds[1, 11]. Prefers a slightly alkaline soil[200]. A very hardy and ornamental tree[1], it is recommended for cultivation in severe cold climates[183]. Plants produce a deep taproot and they are intolerant of root disturbance[1, 11]. Seedlings should be planted out into their permanent positions as soon as possible and given some protection for their first winter or two since they are somewhat tender when young[1, 11]. Flower initiation depends upon suitable conditions in the previous summer[200]. The flowers and young growths can be destroyed by even short periods down to -2°C, but fortunately plants are usually late coming into leaf[200]. Any pruning should only be carried out in late summer to early autumn or when the plant is fully dormant otherwise wounds will bleed profusely and this will severely weaken the tree[200]. Trees have a dense canopy which tends to reduce plant growth below them. We have no specific information for this species, but the roots of several members of this genus produce substances that are toxic to many plant species, especially apples (*Malus* species), members of the Ericaceae, *Potentilla* spp and the white pines (certain *Pinus* spp.)[200]. The leaves of many species also secrete substances that have an inhibitory effect on plants growing underneath them. All in all this is not a very good companion plant[K]. Closely allied to *J. cathayensis*[11].

5.2.260 *Fragaria*

Strawberry, Beach strawberry, Pacific beach strawberry, Sandwich beach strawberry, Virginia strawberry

4 tin 8 cyuc 3 kcaak 0 tcan 0 dwat 0.2 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatprikliw hpa7tmwatli yfjfxre7t hjonli

drutta *Fragaria* is a PERENNIAL growing to 0.2 m (0ft 8in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from

May to November, and the seeds ripen from June to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit**Edible Uses:** Fruit - raw[K]. A delicious flavour, the fruit is almost as large as an average cultivated strawberry but it is not very freely produced[187, K].

tcanta The plant spreads rapidly by means of runners and can be used as a ground cover[K].

nrakta A hybrid of garden origin, F x ananassa x *Potentilla palustris*, *ksacta* Not known in the wild.

propta Seed - sow early spring in a greenhouse. The seed can take 4 weeks or more to germinate. The seedlings are very small and slow-growing at first, but then grow rapidly. Prick them out into individual pots when they are large enough to handle and plant them out during the summer. This plant is a bi-generic hybrid and will not breed true from seed. Division of runners, preferably done in July/August in order to allow the plants to become established for the following years crop[200]. They can also be moved in the following spring if required, though should not be allowed to fruit in their first year. The runners can be planted out direct into their permanent positions.

nwatta Prefers a fertile, well-drained, moisture retentive soil in a sunny position. Tolerates semi-shade though fruit production will be reduced. This species is a hybrid of garden origin between two species from different genera, the cultivated strawberry, *Fragaria* x *ananassa* and the marsh cinquefoil, *Potentilla palustris*. It should eventually get a Latin name that combines parts of the two generic names, but until then it is included here under *Fragaria*[K]. To date (1995) only one cultivar is available in garden centres etc. Called 'Pink Panda' it spreads very freely by means of runners, flowers heavily all through the summer, but does not produce much fruit[K].

5.2.261 *Cardamine pratensis*

Cuckoo Flower

4 tin 8 cyuc 3 kcaak 2 tcan 2 dwat 0.5 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatprikliw hpa7tmwatli yfjfxre7t hjonli

drutta *Cardamine pratensis* is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from April to June, and the seeds ripen from May to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: Flowers **Edible Uses:** Leaves and young shoots - raw or cooked[2, 5, 12, 52, 115]. Rich in vitamins and minerals[268], especially vitamin C[238], but with a bitter and pungent flavour[27]. The leaves and young shoots are harvested in the spring and taste rather like water cress[9]. The leaves can be available early in the year[K] and when used in small quantities make a very acceptable addition to salads[183, K]. Flowers and flower buds - raw. A pungent cress-like flavour[183, K]. The white flowers are very attractive, they make a pleasant nibble and also add a delicious flavour to salads[K].

tcanta Attracts wildlife.

dwatta Antirheumatic Antiscorbutic Antispasmodic Carminative Digestive Diuretic Stimulant Vitamin CCuckoo flower is seldom used in herbalism, though an infusion of the leaves has been used to treat indigestion and promote appetite[268]. The leaves and the flowering plant are antirheumatic, antiscorbutic, antispasmodic, carminative, digestive, diuretic, stimulant[9, 146, 172, 238, 240]. They are used internally in the treatment of chronic skin complaints, asthma and hysteria[238]. The plant is harvested in spring and early summer and is best used when fresh[9, 238].

nrakta Most of Europe, including Britain, N. Asia and N. America. **ksacta** Moist, slightly shady places in meadows and

5.2.296 *Polygonatum multiflorum*

Solomon's Seal, Eurasian Solomon's seal

4 tin 8 cyuc 2 kcaak 0 tcan 3 dwat m hkuc pcmhmim cyutli hgatyuctuc hwicli hrasjlutnyikfrip hpa7tli flatprikliw hpa7tmwatli yfjfxre7t hjonli

drutta *Polygonatum multiflorum* is a PERENNIAL growing to 1.2 m (4ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in June, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers dry or moist soil and can tolerate drought.

pcista Large quantities of the fruits are poisonous[10, 19, 65]. It has laxative properties and can increase the laxative effects of aloe, rhamnus, senna and yellow dock. May lead to gastrointestinal irritation with prolonged use. Overdose leads to nausea, diarrhoea, gastric complaints [301].

kcakta Edible Parts: Leaves **RootEdible Uses:** Young shoots - cooked. Boiled and used as an asparagus substitute, they make an excellent vegetable[2, 4, 115] and are widely used in Turkey[244]. Root - cooked[177, 179]. Rich in starch[115]. The root should be macerated for some time in water in order to remove bitter substances[4]. Normally only used in times of famine, the root was powdered and then made into a bread by the North American Indians[244].

tcanta CosmeticPlants can be grown for ground cover when spaced about 30cm apart each way[208]. A distilled water made from the whole plant is used as a cosmetic to improve the complexion[244].

dwatta Astringent Demulcent Dysentery Emetic Poulitce TonicSolomon's seal has been used for thousands of years in herbal medicine. It is used mainly in the form of a poultice and is believed to prevent excessive bruising and to stimulate tissue repair[254]. The root is astringent, demulcent, emetic and tonic[4, 21, 61, 240]. An infusion is healing and restorative, it is good in the treatment of stomach inflammations, chronic dysentery etc[4]. It is used with other herbs in the treatment of pulmonary problems, including tuberculosis, and women's complaints[4, 254]. The powdered roots make an excellent poultice for bruises, piles, inflammation etc[4]. The root is harvested in the autumn and dried for later use[4]. The plant should not be used internally except under professional supervision[254]. A distilled water made from the whole plant has been used as a skin tonic and is an ingredient of expensive cosmetics[244]. The dried powdered roots and flowers have been used as a snuff to promote sneezing and thus clear the bronchial passages[244].

nrakta Europe, including Britain, from Scandinavia south and east to Spain, and temperate Asia to Japan. **ksacta** Woodland, usually on limestone[187].

propta Seed - best sown as soon as it is ripe in early autumn in a shady part of a cold greenhouse[200]. Sow stored seed as early in the year as possible. Germination can be slow, they may not come true to type[200] and it takes a few years for them to reach a good size. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a shady position in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in March or October. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Prefers a fertile humus rich moisture retentive well-drained soil in cool shade or semi-shade[200]. Succeeds in dry shade if the soil is rich in humus[190]. Grows well in heavy clay soils. Plants are intolerant of heat and drought but tolerate most other conditions[200]. Another report suggests that they tolerate drought so long as the soil is rich in humus[190]. A very ornamental plant[1], growing well on the woodland edge[24]. There are some named forms[188]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. The young shoots of most members of this genus are very attractive to slugs[K]. Hybridizes with other members of this genus[200].

5.2.297 *Lonicera japonica*

Japanese Honeysuckle

4 tin 10 cyuc 2 kcaak 0 tcan 3 dwat 5 m hkuc hmimhtut cyutli kyuctuc hwicli hrasjlutnyik hpa7tli flatprikliw hpa7tmwatli xre7t hjonli

drutta *Lonicera japonica* is an evergreen Climber growing to 5 m (16ft) by 5 m (16ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in leaf all year, in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Moths. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista The leaves contain saponins[179]. Saponins are quite toxic but are poorly absorbed by the human body and so most pass through without harm. They can be found in many common foods such as some beans. Thorough cooking, and perhaps changing the cooking water once, will normally remove most of the saponins. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K].

kcakta Edible Parts: Flowers **LeavesEdible Uses:** TeaLeaves - cooked. The parboiled leaves are used as a vegetable[183]. Some caution is advised, see notes above on toxicity. Flowers - sucked for their sweet nectar[183], used as a vegetable or made into a syrup and puddings[183]. A tea is made from the leaves, buds and flowers[177, 183].

tcanta Basketry InsecticideA very vigorous climbing plant, it makes a good dense ground cover plant where it has the space to run over the ground but it will swamp smaller plants[197, 200]. The sub-species *L. japonica* repens is especially used for this purpose on the continent[182]. The cultivar 'Haliana' has also been recommended[188, 197]. This cultivar should be clipped back severely in the spring if it gets untidy, it responds well to such conditions[208]. Plants should be spaced about 1 metre apart each way[208]. The plant is said to be insecticidal[218]. The stems have been used in making baskets[257].

dwatta Antibacterial Antiinflammatory Antispasmodic Antiviral Depurative Diuretic Dysentery Febrifuge Skin TB VDThe stems and flower buds are alternative, antibacterial, anti-inflammatory, antispasmodic, depurative, diuretic, febrifuge[147, 174, 176, 178, 238]. The plant is also used to reduce blood pressure[174, 176, 238]. The stems are used internally in the treatment of acute rheumatoid arthritis, mumps and hepatitis[238]. The stems are harvested in the autumn and winter, and are dried for later use[238]. The stems and flowers are used together as an infusion in the treatment of upper respiratory tract infections (including pneumonia) and dysentery[238]. An infusion of the flower buds is used in the treatment of a wide range of ailments including syphilitic skin diseases and tumours, bacterial dysentery, colds, enteritis, pain, swellings etc[174, 176, 218, 222, 238, 279]. Experimentally, the flower extracts have been shown to lower blood cholesterol levels and are antibacterial, antiviral and tuberculostatic[222, 279]. Externally, the flowers are applied as a wash to skin inflammations, infectious rashes and sores[238]. The flowers are harvested in early morning before they open and are dried for later use[238]. The plant has a similar action to *Forsythia suspensa* and is usually used in combination with that species to achieve a stronger action[176]. This plant has become a serious weed in many areas of N. America, it might have the potential to be utilized for proven medical purposes[222].

nrakta E. Asia - China, Japan, Korea. Locally naturalized in Britain[50]. **ksacta** Thickets in hills and mountains all over Japan[58]. Woods in the mountains and lowlands of Korea[279].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed requires 2 months cold stratification[113] and should be sown as soon as possible in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm with or without a heel, July/August in a frame. Good

female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The seed is rich in saponins[169]. Although poisonous, saponins are poorly absorbed by the human body and so most pass through without harm. Saponins are quite bitter and can be found in many common foods such as some beans. They can be removed by carefully leaching the seed or flour in running water. Thorough cooking, and perhaps changing the cooking water once, will also normally remove most of them. However, it is not advisable to eat large quantities of food that contain saponins. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K].

kcakta Edible Parts: SeedEdible Uses: Seed - cooked[2, 22, 105, 177]. It can be dried and ground into a powder and used as a gruel. The seed is quite large and easily harvested, though it is rarely produced in Britain[11]. Unfortunately, it is rich in bitter-tasting saponins and these need to be leached out before the seed can be eaten. See notes on toxicity above. The following notes apply to *A. californica*, but are probably also relevant here:- The seed needs to be leached of toxins before it becomes safe to eat - the Indians would do this by slow-roasting the nuts (which would have rendered the saponins harmless) and then cutting them into thin slices, putting them into a cloth bag and rinsing them in a stream for 2 - 5 days[213]. Most of the minerals etc would also have been leached out by this treatment[K].

tcanta Miscellany Soap WoodSaponins contained in the seed are used a soap substitute[169]. The saponins can be easily obtained by chopping the seed into small pieces and infusing them in hot water. This water can then be used for washing the body, clothes etc. Its main drawback is a lingering odour of horse chestnuts[K]. Plants can be used as a tall ground cover for large areas of land[208]. They are slow to establish but eventually form large spreading clumps[208]. Wood - easily worked. Used for making water troughs, packing cases, tea boxes, ornamental articles etc[194].

dwatta Antiperiodic Antirheumatic MiscellanyAntiperiodic, antirheumatic[194]. Used in the treatment of colic, piles, constipation and whooping cough[194].

nrakta Southern N. America - Georgia and Alabama to Florida. ksacta Wooded bluffs and rich woods, also by streams, on the coastal plain[72, 184].

propta Seed - best sown outdoors or in a cold frame as soon as it is ripe[11, 80]. The seed germinates almost immediately and must be given protection from severe weather[130]. The seed has a very limited viability and must not be allowed to dry out. Stored seed should be soaked for 24 hours prior to sowing and even after this may still not be viable[80, 113]. It is best to sow the seed with its 'scar' downwards[130]. If sowing the seed in a cold frame, pot up the seedlings in early spring and plant them out into their permanent positions in the summer. Root cuttings 5 - 7 cm long in December. Store the roots upside down in sand and pot them up in March/April[78]. Grow them on until they are 20cm or more tall and then plant them out into their permanent positions, preferably in late spring or early summer after the last expected frosts. Division of suckers in the dormant season[200]. The suckers can be planted out direct into their permanent positions if required.

nwatta Landscape Uses:Border, Massing, Specimen, Woodland garden. Prefers a deep loamy well-drained soil but is not too fussy[1, 11]. Succeeds in most situations in sun or shade[126, 200]. Plants are very shade tolerant[200]. A very ornamental plant[1, 11], it is very hardy to about -20°C[184] though it is slow to establish[208]. The young growth in spring can be damaged by late frosts. The flowers have a delicate honey perfume[245]. This species does best on the western side of Britain according to one report[126] whilst another says that it is best in a continental climate, which would suggest that it was best grown in the eastern half of the country[200]. Trees rarely fruit in Britain except after a long hot, dry summer[11, 130]. Spreads freely by suckers[182]. Grows well on a lawn[11]. Most members of this genus transplant easily, even when fairly large[11]. Special Features:Attractive foliage, North American native, All

or parts of this plant are poisonous, Wetlands plant, Blooms are very showy.

5.2.295 Prunus davidiana

Chinese Wild Peach

4 tlin 8 cyuc 2 kcaok 0 tcan 3 dwat 9 m hkuc
hmimhtut cyullt tcup hwicli hrasjlutnyik hpa7tli fatprlikwis
hpa7tmwatli xre7t hjonli

drutta Prunus davidiana is a deciduous Tree growing to 9 m (29ft) by 9 m (29ft). See above for USDA hardness. It is hardy to UK zone 4 and is not frost tender. It is in flower from March to May, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: Fruit SeedEdible Uses: The seed is used in China as a flavouring in confectionery and some special dishes. They are somewhat bitter due to the presence of prussic acid so should be used in strict moderation[177, 183]. Fruit[183]. The fruit is about 3cm in diameter and contains one large seed[200].

tcanta Dye RootstockUsed as a disease-resistant low-chill rootstock for the cultivated peach, *Prunus persica*[183]. A green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168].

dwatta Analgesic Antiasthmatic Anticoagulant Antitussive Aperient Emollient HaemolyticThe seed is analgesic, antiasthmatic, anticoagulant, antitussive, aperient, emollient and haemolytic[176]. It is used in the treatment of amenorrhoea, dysmenorrhoea, traumatic pain due to blood stasis, constipation of aged and debilitated patients, coughs and asthma[176]. The seed contains amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta E. Asia - China. ksacta Forests, thickets, slopes, mountain valleys and waste fields at elevations of 800 - 3200 metres[266].

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sown stored seed in a cold frame as soon as it is possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200]. Softwood cuttings from strongly growing plants in spring to early summer in a frame[200]. Layering in spring.

nwatta Thrives in a well-drained moisture-retentive loamy soil[11, 200]. Prefers some lime in the soil but is likely to become chlorotic if too much lime is present[1]. Succeeds in sun or partial shade though it fruits better in a sunny position[11, 200]. There are some named varieties selected for their ornamental value[200]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. Plants flower very early in the year and the flowers are often damaged by late frosts[188]. Plants in this genus are notably susceptible to honey fungus[200].

by streams[13, 31, 187], usually in acid soils[9].

propta Seed - sow outdoors in a seedbed in a shady position in April. Plant out in autumn or spring. Division in spring or autumn[238]. The plant produces young plants at the base of its leaflets. When large enough, these can be easily separated from the main plant and grown on as individual plants[K].

nwatta Succeeds in most soils[1, 111] so long as they are moist or wet[187, 188]. Prefers a cool damp soil[111]. Succeeds in full sun or partial shade[238]. Cuckoo flower was at one time much used as a spring salad plant and was often sold in local markets. It has, however, fallen out of favour and is scarcely used at present[268]. A polymorphic species[17]. A very ornamental plant, non-invasive and well suited to the wild garden though it may require protection from wood pigeons who eat out the young buds in spring[187]. It grows well in the spring meadow[24]. A food plant for the orange tip butterfly[24]. There is at least one named variety, selected for its ornamental value. 'Flore Pleno' is a double flowered form[187]. The plant is heat tolerant in zones 8 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

5.2.262 Achillea millefolium

Yarrow, Boreal yarrow, California yarrow, Giant yarrow, Coast yarrow, Western yarrow, Pacific yarrow
4 tlin 8 cyuc 3 kcaok 4 tcan 4 dwat m hkuc
hmimhtut cyullt hgtakytcup hwicli hyishrasjlutnyik hpa7tli
fatprlikwisslip hpa7tmwatli xre7t hjonli

drutta Achillea millefolium is a PERENNIAL growing to 0.6 m (2ft) by 0.6 m (2ft in) at a fast rate. See above for USDA hardness. It is hardy to UK zone 2 and is not frost tender. It is in flower from June to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

pcista Extended use of this plant, either medicinally or in the diet, can cause allergic skin rashes or lead to photosensitivity in some people[21, 238]. Theoretically yarrow can enhance the sedative effects of other herbs (e.g. valerian, kava, German chamomile, hops) and sedative drugs. Possible sedative and diuretic effects from ingesting large amounts [301].

kcakta Edible Parts: LeavesEdible Uses: Condiment TeaLeaves - raw or cooked[4, 5, 46, 52]. A rather bitter flavour, they make an acceptable addition to mixed salads and are best used when young[9, 183, K]. The leaves are also used as a hop-substitute for flavouring and as a preservative for beer etc[2, 9, 53, 183]. Although in general yarrow is a very nutritious and beneficial plant to add to the diet, some caution should be exercised[K]. See the notes above on possible toxicity. An aromatic tea is made from the flowers and leaves[183]. An essential oil from the flowering heads is used as a flavouring for soft drinks[183].

tcanta Companion Compost Cosmetic Dye Essential Hair Liquid feed RepellentThe growing plant repels beetles, ants and flies[14, 99, 172]. The plant has been burnt in order to ward off mosquitoes[257]. A liquid plant feed can be made from the leaves[54]. You fill a container with the leaves and then add some water. Leave it to soak for a week or

two and then dilute the rather smelly dark liquid, perhaps 10 - 1 with water though this figure is not crucial[K]. This plant is an essential ingredient of 'Quick Return' herbal compost activator[32]. This is a dried and powdered mixture of several herbs that can be added to a compost heap in order to speed up bacterial activity and thus shorten the time needed to make the compost[K]. The fragrant seeds have been used to impart a pleasant smell indoors[257]. An essential oil obtained from the leaves is used medicinally[17, 46, 61]. The leaves contain from 0.6 to 0.85% essential oil[240]. The leaves have been used as a cosmetic cleanser for greasy skin[268]. Yellow and green dyes are obtained from the flowers[168]. A good ground cover plant, spreading quickly by its roots[208]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch. Nectary, invertebrate shelter.

dwatta Antidiarrhoeal Antiinflammatory Antiseptic Antispasmodic Appetizer Aromatic Astringent Carminative Cholagogue Diaphoretic Digestive Emmenagogue Odontalgic Stimulant Tonic Vasodilator VulneraryYarrow has a high reputation and is widely employed in herbal medicine, administered both internally and externally. It is used in the treatment of a very wide range of disorders but is particularly valuable for treating wounds, stopping the flow of blood, treating colds, fevers, kidney diseases, menstrual pain etc[218, 238, 254, 257]. The whole plant is used, both fresh and dried, and is best harvested when in flower[222]. Some caution should be exercised in the use of this herb since large or frequent doses taken over a long period may be potentially harmful[222], causing allergic rashes and making the skin more sensitive to sunlight[238]. The herb combines well with *Sambucus nigra* flowers (Elder) and *Mentha x piperita* vulgaris (Peppermint) for treating colds and influenza[268]. The herb is antiseptic, antispasmodic, mildly aromatic, astringent, carminative, cholagogue, diaphoretic, digestive, emmenagogue, odontalgic, stimulant, bitter tonic, vasodilator and vulnerary[4, 9, 14, 21, 54, 145, 165, 172, 238, 240, 254]. It also contains the anti-inflammatory agent azulene, though the content of this varies even between plants in the same habitat[238]. The herb is harvested in the summer when in flower and can be dried for later use[4]. The fresh leaf can be applied direct to an aching tooth in order to relieve the pain[268].

nrakta Europe, including Britain, north to 71°, and east to western Asia. ksacta Meadows, pastures, lawns etc. on all but the poorest soils[17].

propta Seed - sow spring or early autumn in a cold frame[133]. The seed usually germinates in 1 - 3 months[133]. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn. Very easy, the divisions can be planted direct into their permanent positions. Divisions succeed at any time of the year. Basal cuttings of new shoots in spring. Very easy, collect the shoots when they are about 10cm tall, potting them up individually in pots and keeping them in a warm but lightly shaded position. They should root within 3 weeks and will be ready to plant out in the summer.

nwatta Landscape Uses:Container, Ground cover, Massing, Seashore, Woodland garden. Succeeds in most soils and situations but prefers a well-drained soil in a sunny position[1, 14]. Shade tolerant[13]. Plants live longer when grown in a poor soil[200] and also do well on lime[208]. Established plants are very drought tolerant[200], they can show distress in very severe droughts but usually recover[190]. It remains green after grass has turned brown in a drought[187]. Plants succeed in maritime gardens[233]. The plant has a very spreading root system and is usually quite invasive[233, K]. A very hardy plant, tolerating temperatures down to about -25°C[187]. Yarrow is an excellent plant for growing in lawns, meadows, orchards etc., it is tolerant of repeated close cutting and of being walked on[20, 54]. It works to improve the soil fertility[20, 54]. A very good companion plant, it improves the health of plants growing nearby and enhances their essential oil content thus making them more resistant to insect predations[14, 18, 20, 53]. There are some named forms, selected for their ornamental value[183, 238]. 'Pink' (syn. 'Rosea') has very aromatic foliage and deep pink flowers[183]. Hybridizes freely with other members of this genus[200]. A good bee plant, it is an important nectar source for many insects[24]. Special Fea-

tures: Attractive foliage, Edible, Fragrant foliage, Invasive, Naturalizing, Attracts butterflies, Suitable for cut flowers, Suitable for dried flowers. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

5.2.263 *Mentha arvensis*

Corn Mint, Wild mint
4 tin 8 cyuc 3 kcaak 3 tcan 2 dwat 0.5 m hku
hmimhtut cyutli kyuctup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta *Mentha arvensis* is a PERENNIAL growing to 0.5 m (1ft 8in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from May to October, and the seeds ripen from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

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

kcakta Edible Parts: LeavesEdible Uses: Condiment TeaLeaves - raw or cooked. A reasonably strong minty flavour with a slight bitterness, they are used as a flavouring in salads or cooked foods[5, 172, 183]. A herb tea is made from the fresh or dried leaves[21, 183]. An essential oil from the plant is used as a flavouring in sweets and beverages[183]. The leaves contain about 0.2% essential oil[218].

tcanta Essential Repellent StrewingThe plant is used as an insect repellent[18, 20, 99]. Rats and mice intensely dislike the smell of mint. The plant was therefore used in homes as a strewing herb and has also been spread in granaries to keep the rodents off the grain[244]. The leaves also repel various insects[257]. An essential oil is obtained from the plant[238]. The yield from the leaves is about 0.8%[240]. The sub-species *M. arvensis piperascens* produces the best oil, which can be used as a substitute for, or adulterant of, peppermint oil[238]. Yields of up to 1.6% have been obtained from this sub-species[240].

dwatta Anaesthetic Antiplogistic Antiseptic Antispasmodic Aromatic Cancer Carminative Diaphoretic Emmenagogue Ferbrifuge Galactofuge Salve Stimulant Stomachic-Corn mint, like many other members of this genus, is often used as a domestic herbal remedy, being valued especially for its antiseptic properties and its beneficial effect on the digestion. Like other members of the genus, it is best not used by pregnant women because large doses can cause an abortion. The whole plant is anaesthetic, antiplogistic, antispasmodic, antiseptic, aromatic, carminative, diaphoretic, emmenagogue, galactofuge, refrigerant, stimulant and stomachic[147, 172, 218]. A tea made from the leaves has traditionally been used in the treatment of fevers, headaches, digestive disorders and various minor ailments[222]. The leaves are a classical remedy for stomach cancer[218]. Another report says that this species is not very valuable medicinally[4]. The leaves are harvested as the plant comes into flower and can be dried for later use[238]. The essential oil in the leaves is antiseptic, though it is toxic in large doses[222].

nrakta Europe, including Britain, from Scandinavia south and east to Spain, N. Asia and the Himalayas. ksacta Arable land, heaths, damp edges of woods[5, 17].

propta Seed - sow spring in a cold frame. Germination is usually fairly quick. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. *Mentha* species are very prone to hybridisation and so the seed cannot be relied on to breed true. Even without hybridisation, seedlings will not be uniform and so the content of medicinal oils etc will vary. When growing plants with a particular aroma it is best to propagate them by division[K]. Division can be easily carried out at almost any time of the year, though it is probably best done in the spring or autumn to allow the plant to establish more quickly. Virtually any part of the root is capable of growing into a new plant. Larger divisions can be planted out direct into their permanent positions. However, for maximum increase it is possible to divide the roots up into sections no more than 3cm long and pot these up in light shade in a cold frame. They will quickly become established and can be planted out in the summer.

nwatta An easily grown plant, it succeeds in most soils and situations so long as the soil is not too dry[1, 16, 200]. This species tolerates much drier conditions than other members of the genus[238]. Prefers a slightly acid soil[16]. Grows well in heavy clay soils. A sunny position is best for production of essential oils, but it also succeeds in partial shade. Plants are hardy to at least -15°C[238]. Most mints have fairly aggressive spreading roots and, unless you have the space to let them roam, they need to be restrained by some means such as planting them in containers that are buried in the soil[K]. Hybridizes freely with other members of this genus. Polymorphic[200]. The whole plant has a very strong, almost oppressive, smell of mint[245]. The flowers are very attractive to bees and butterflies[24]. A good companion plant for growing near brassicas and tomatoes, helping to deter insect pests[20]. Members of this genus are rarely if ever troubled by browsing deer[233]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2].

5.2.264 *Mentha arvensis piperascens*

Japanese Mint
4 tin 8 cyuc 3 kcaak 0 tcan 2 dwat 0.5 m hku
hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta *Mentha arvensis piperascens* is a PERENNIAL growing to 0.5 m (1ft 8in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from May to October, and the seeds ripen from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

kcakta Edible Parts: LeavesEdible Uses: Condiment TeaLeaves - raw or cooked. Used as a flavouring in salads or cooked foods[5, 172, 183], they have a strong taste of peppermint[238]. A herb tea is made from the fresh or dried leaves[21, 183]. An essential oil from the plant is used as a flavouring in sweets and beverages[183]. The leaves contain about 0.2% essential oil[218].

tcanta Essential Repellent StrewingThe plant is used as an insect repellent[18, 20, 99]. Rats and mice intensely dislike the smell of mint. The plant was therefore used in homes as a strewing herb and has also been spread in granaries to keep the rodents off the grain[244]. An essential oil is obtained from the plant[238]. It can be used as a substitute

an overactive thyroid gland and the racing heartbeat that often accompanies this condition[254]. The whole plant is used as an astringent, hypoglycaemic, mild narcotic and mild sedative[4, 102, 222, 238]. It also slows and strengthens heart contractions[238]. The plant has been shown to be of value in the treatment of hyperthyroidism[222, 238], it is also used in the treatment of coughs, bleeding from the lungs and consumption, excessive menstruation etc[4, 238]. It should not be prescribed for pregnant women or patients with hypothyroidism[238]. The plant is harvested as flowering begins and can be used fresh or dried, in an infusion or as a tincture[4, 238]. The root has been chewed, a portion swallowed and the rest applied externally in the treatment of snakebites[257]. Current uses are predominantly for increased activity of the thyroid gland and for premenstrual syndrome symptoms such as breast pain [301]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve *Lycopus* for nervousness and premenstrual syndrome (see [302] for critics of commission E).

nrakta Eastern N. America - New York and Wisconsin south to Georgia and Texas. ksacta Low damp shady ground in rich moist soils[43].

propta Seed - sow spring or autumn in a cold frame[238]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse for their first year. Plant them out into their permanent positions in early summer. Division in spring or autumn[238]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Tolerates most soil types so long as they are wet. Succeeds in full sun or in partial shade[238], in damp meadows or in wet places by ponds or streams[200].

5.2.292 *Humulus japonicus*

Japanese Hop
4 tin 8 cyuc 2 kcaak 0 tcan 1 dwat 6 m hku
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta *Humulus japonicus* is a PERENNIAL CLIMBER growing to 6 m (19ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from July to August, and the seeds ripen from September to October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves OilEdible Uses: OilYoung leaves and young shoots - cooked[105, 177, 179]. Use before the end of May.

tcanta OilThe seed oil is used to make soap[266].
dwatta Diuretic Tonic UrinaryThe whole plant is diuretic and a genito-urinary tonic[178, 266].

nrakta E. Asia - China, Japan, Korea. ksacta Thickets and roadsides in lowland areas all over Japan[58]. Forest margins, wastelands and along the sides of streams in China[266].

propta Seed - sow spring in a cold frame[37]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring as new growth begins[1]. Take the divisions when the new shoots are about 10cm above ground level. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring. Basal cuttings in March. Harvest the shoots when they are about 10 - 15cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Easily grown in a good garden soil in sun or semi-shade[1, 200]. Prefers a deep rich loam[11]. A fast growing plant, with annual stems of up to 10 metres long being

produced[219]. Plants rarely survive the winter outdoors in Britain, so are best grown as annuals[219]. This report needs confirmation since the plant is also reported as being hardy in zone 5 which would mean that it should succeed outdoors virtually anywhere in Britain[K]. A climbing plant, supporting itself by twining around the branches of other plants[219]. The bruised leaves are refreshingly aromatic whilst the flowers cast a pleasing scent[245]. Dioecious. Male and female plants must be grown if seed is required.

5.2.293 *Vitis amurensis*

Amur River Grape, Amur grape
4 tin 8 cyuc 2 kcaak 0 tcan 1 dwat 15 m hku
hmimhtut cyutli kyuctup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta *Vitis amurensis* is a deciduous Climber growing to 15 m (49ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from May to July, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit - raw, cooked or dried for winter use[183]. It can also be made into drinks[177]. The fruit is much esteemed[151]. Small and somewhat harsh in flavour[151], it is succulent but usually bitter[200]. The fruit is about 16mm long and 10mm wide[200]. Young leaves - cooked[179]. Used as a boiled vegetable[183]. The leaves can also be wrapped around other foods and then baked, they impart a pleasant flavour. Young tendrils - raw or cooked.

tcanta DyeA yellow dye is obtained from the fresh or dried leaves[168].

dwatta TonicThe root is tonic[218].
nrakta E. Asia - C. and N. Korea. ksacta Rich damp woodland soils[200].

propta Seed - best sown in a cold frame as soon as it is ripe[K]. Six weeks cold stratification improves the germination rate, and so stored seed is best sown in a cold frame as soon as it is obtained. Germination should take place in the first spring, but sometimes takes another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant out in early summer. Cuttings of mature wood of the current seasons growth, December/January in a frame. These cuttings can be of wood 15 - 30cm long or they can be of short sections of the stem about 5cm long with just one bud at the top of the section. In this case a thin, narrow strip of the bark about 3cm long is removed from the bottom half of the side of the stem. This will encourage callusing and the formation of roots. Due to the size of these cuttings they need to be kept in a more protected environment than the longer cuttings. Layering.

nwatta Prefers a deep rich moist well-drained moderately fertile loam[1, 200]. Grows best in a calcareous soil[200]. Succeeds in sun or partial shade though a warm sunny position is required for the fruit to ripen[200]. Very hardy, tolerating temperatures down to about -40°C, this species is a potential source of hardiness in a breeding programme with the common grape, *Vitis vinifera*[183]. Plants climb by means of tendrils[182]. Any pruning should be carried out in winter when the plants are dormant otherwise they bleed profusely[182]. Plants in this genus are notably susceptible to honey fungus[200].

5.2.294 *Aesculus parviflora*

Bottlebrush buckeye
4 tin 9 cyuc 2 kcaak 0 tcan 1 dwat 4 m hku
pcimhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta *Aesculus parviflora* is a deciduous Shrub growing to 4 m (13ft) by 4 m (13ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in August, and the seeds ripen from October to November. The species is hermaphrodite (has both male and

pcista Plants can contain quite high levels of oxalic acid, which is what gives the leaves of many members of this genus an acid-lemon flavour. Perfectly alright in small quantities, the leaves should not be eaten in large amounts since the oxalic acid can lock-up other nutrients in the food, especially calcium, thus causing mineral deficiencies. The oxalic acid content will be reduced if the plant is cooked. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238]. Avoid during pregnancy and breast feeding.

kcakta Edible Parts: Leaves SeedEdible Uses: Coffee-Leaves - raw or cooked[5, 85, 159]. They can also be dried for later use[12]. The leaves can be added to salads, cooked as a potherb or added to soups[183]. Only the very young leaves should be used, preferably before the stems have developed, and even these are likely to be bitter[12, 95, 257]. If used in early spring and in the autumn they can often be fairly pleasant tasting[85, 159, K]. The leaves are very rich in vitamins and minerals, especially iron and the vitamins A and C[183, 244]. A nutritional analysis is available[218]. Stems - raw or cooked[257]. They are best peeled and the inner portion eaten[257]. Seed - raw or cooked[172, 257]. It can be used as a piñole or can be ground into a powder and used as a flour for making pancakes etc[85, 102, 183, 257]. The seed is very fiddly to harvest and prepare[62]. The roasted seed has been used as a coffee substitute[207].

tcanta Compost DyeYellow, dark green to brown and dark grey dyes can be obtained from the roots. They do not need a mordant[168]. An alternative ingredient of 'OR' herbal compost activator[32]. (is it the flowers?) This is a dried and powdered mixture of several herbs that can be added to a compost heap in order to speed up bacterial activity and thus shorten the time needed to make the compost[K].

dwatta Alterative Antiscorbutic Astringent Cancer Chologogue Depurative Homeopathy Laxative Poultice Salve TonicCurled dock has a long history of domestic herbal use. It is a gentle and safe laxative, less powerful than rhubarb in its action so it is particularly useful in the treatment of mild constipation[254]. The plant has valuable cleansing properties and is useful for treating a wide range of skin problems[254]. All parts of the plant can be used, though the root is most active medicinally. The root is alterative, antiscorbutic, astringent, chologogue, depurative, laxative and mildly tonic[4, 21, 46, 94, 165]. It used to be sold as a tonic and laxative[212]. It can cause or relieve diarrhoea according to the dose, harvest time and relative concentrations of tannin(astringent) and anthraquinones (laxative) that are present[222]. It is used internally in the treatment of constipation, diarrhoea, piles, bleeding of the lungs, various blood complaints and also chronic skin diseases[4, 238, 257]. Externally, the root can be mashed and used as a poultice and salve, or dried and used as a dusting powder, on sores, ulcers, wounds and various other skin problems[257]. The root has been used with positive effect to restrain the inroads made by cancer, being used as an alterative and tonic[4]. The root is harvested in early spring and dried for later use[4]. Some caution is advised in its use since excess doses can cause gastric disturbance, nausea and dermatitis[222, 238]. The seed is used in the treatment of diarrhoea[4, 218]. A homeopathic remedy is made from the fresh root, harvested in the autumn before frost has touched the plant[232]. It is only used in the treatment of a specific type of cough[232].

nrakta Most of Europe, including Britain, to N. Africa. ksacta Growing almost anywhere[5], it is found especially in grassy places, waste ground, roadsides and near sand dunes and is a serious weed of agriculture[17, 244].

propta Seed - this plant does not require any help in its propagation.

nwatta Succeeds in most soils, preferring a moist moderately fertile well-drained soil in a sunny position[200]. The plant does not need any help in growing, it is doing very nicely in Britain where it is a serious weed of agriculture. A very important food plant for the caterpillars of many species of butterfly[30]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fleshy. Thick or swollen - fibrous or tap root [2-1].

5.2.290 Berberis gagnepainii

4 tlin 8 cyuc 2 kcaak 0 tcan 2 dwat 2.4 m hkuc hmimhtut cyutli kyuctup hwicli hyishrasjlutnykifrip hpa7tli flatprikklwis hpa7tmwatli fyfjxre7t hjonli

drutta Berberis gagnepainii is an evergreen Shrub growing to 2.4 m (7ft) by 2 m (6ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf all year, in flower in June, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. The fruits are about 10mm long[200].

tcanta Dye Hedge HedgeThe plant makes an impenetrable hedge that can be trimmed or left to its own devices[29, 182, 200]. A yellow dye is obtained from the root.

dwatta Antibacterial Cancer DysenteryBerberine, universally present in rhizomes of Berberis species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Licorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta E. Asia - China in Sichuan. ksacta Thickets and woodlands, 2000 - 4000 metres[109].

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78]. Suckers, removed in late autumn/early winter and planted out in situ or potted up and planted out in late spring[200].

nwatta Prefers a warm moist loamy soil and light shade but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. A number of cultivars have been selected for their ornamental value[200]. Hybridizes freely with other members of this genus[1]. Plants can be pruned back quite severely, they resprout well from the base[200].

5.2.291 Lycopus virginicus

Bugleweed, Virginia water horehound
4 tlin 8 cyuc 2 kcaak 0 tcan 3 dwat 0.6 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatprikklwis hpa7tmwatli xre7t hjonli

drutta Lycopus virginicus is a PERENNIAL growing to 0.6 m (2ft) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

pcista Known to cause the enlargement of the thyroid gland. Avoid in patients with thyroid disease or given concomitantly with thyroid therapy. Avoid during pregnancy [301].

kcakta Edible Parts: RootEdible Uses: Root - cooked[46, 61].

dwatta Antianxiety Antidandruff Astringent Cardiac Hypoglycaemic Narcotic SedativeBugleweed has sedative properties and is used in modern herbalism principally to treat

for, or adulterant of, peppermint oil[238]. Yields of up to 1.6% have been obtained[240].

dwatta Anaesthetic Antiphlogistic Antisepic Antispasmodic Aromatic Cancer Carminative Diaphoretic Emmenagogue Febrifuge Galactofuge Salve Stimulant Stomachic-Japanese mint, like many other members of this genus, is often used as a domestic herbal remedy, being valued especially for its essential oil[279] which has antiseptic properties and a beneficial effect on the digestion. Like other members of the genus, it is best not used by pregnant women because large doses can cause an abortion. The whole plant is anaesthetic, antiphlogistic, antispasmodic, antiseptic, aromatic, carminative, diaphoretic, emmenagogue, galactofuge, refrigerant, stimulant, stomachic and vasodilator[147, 172, 218, 279]. A tea made from the leaves has traditionally been used in the treatment of fevers, headaches, digestive disorders and various minor ailments[222, 279]. The leaves are a classical remedy for stomach cancer[218]. The essential oil in the leaves is antiseptic, though it is toxic in large doses[222].

nrakta E. Asia - China, Japan and Korea. ksacta Wet grasslands near rivers and lakes at elevations of 200 - 1100 metres in China[266].

propta Seed - sow spring in a cold frame. Germination is usually fairly quick. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. Mentha species are very prone to hybridisation and so the seed cannot be relied on to breed true. Even without hybridisation, seedlings will not be uniform and so the content of medicinal oils etc will vary. When growing plants with a particular aroma it is best to propagate them by division[K]. Division can be easily carried out at almost any time of the year, though it is probably best done in the spring or autumn to allow the plant to establish more quickly. Virtually any part of the root is capable of growing into a new plant. Larger divisions can be planted out direct into their permanent positions. However, for maximum increase it is possible to divide the roots up into sections no more than 3cm long and pot these up in light shade in a cold frame. They will quickly become established and can be planted out in the summer.

nwatta An easily grown plant, it succeeds in most soils and situations so long as the soil is not too dry[1, 16, 200]. This species tolerates much drier conditions than other members of the genus[238]. Prefers a slightly acid soil[16]. Grows well in heavy clay soils. A sunny position is best for production of essential oils, but it also succeeds in partial shade. Plants are hardy to at least -15°C[238]. Most mints have fairly aggressively spreading roots and, unless you have the space to let them roam, they need to be restrained by some means such as planting them in containers that are buried in the soil[K]. The whole plant has a very strong scent of peppermint[245]. Hybridizes freely with other members of this genus. Polymorphic[200]. The flowers are very attractive to bees and butterflies[24]. A good companion plant for growing near brassicas and tomatoes, helping to deter insect pests[20]. Members of this genus are rarely if ever troubled by browsing deer[233].

5.2.265 Spinacia oleracea

Spinach
4 tlin 8 cyuc 3 kcaak 1 tcan 2 dwat 0.3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikklwis hpa7tmwatli nyanhjen hjonli

drutta Spinacia oleracea is a ANNUAL growing to 0.3 m (1ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf all year, in flower from June to September. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The leaves of most varieties of spinach are high in oxalic acid[218]. Although not toxic, this substance does lock up certain minerals in a meal, especially calcium, making them unavailable to the body. Therefore mineral deficiencies

can result from eating too much of any leaf that contains oxalic acid. However, the mineral content of spinach leaves is quite high so the disbenefits are to a large extent outweighed by the benefits. There are also special low-oxalic varieties of spinach that have been developed. Cooking the leaves will also reduce the content of oxalic acid. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238]. Possible methaemoglobinaemia from nitrates in children under 4 months. Anticoagulant patients should avoid excessive intake due to vitamin K content [301].

kcakta Edible Parts: Leaves SeedEdible Uses: ColouringLeaves - raw or cooked[1, 2, 16, 37, 132]. Tender young leaves can be added to salads, older leaves are used as greens or added to soups etc[183, 201]. The leaves contain oxalic acid (6 - 8% in young leaves, 23 - 27% in the cotyledons)[218], see the notes above on toxicity. A nutritional analysis of the leaves is available[218]. Seeds - raw or cooked. It can be sprouted and added to salads[183]. Chlorophyll extracted from the leaves is used as an edible green dye[142].

tcanta DyeA yellow dye is obtained from the leaves[100]. dwatta Appetizer Carminative Febrifuge Hypoglycaemic Laxative UrinaryThe plant is carminative and laxative[218]. In experiments it has been shown to have hypoglycaemic properties[218]. It has been used in the treatment of urinary calculi[240]. The leaves have been used in the treatment of febrile conditions, inflammation of the lungs and the bowels[240]. The seeds are laxative and cooling[240]. They have been used in the treatment of difficult breathing, inflammation of the liver and jaundice[240].

nrakta The origin of this plant is uncertain, it probably arose in S.W. Asia. ksacta Not known in the wild.

propta Seed - sow in situ from March to June for a summer crop. Make successional sowings, perhaps once a month, to ensure a continuity of supply. The seed germinates within about 2 weeks and the first leaves can be harvested about 6 weeks later. Seed is sown in situ during August and September for a winter crop.

nwatta Plants grow best and produce their heaviest crop of leaves on a nitrogen-rich soil[16, 37, 200]. They dislike very heavy or very light soils[37]. They also dislike acid soils, preferring a neutral to slightly alkaline soil[200]. Plants require plenty of moisture in the growing season, dry summers causing the plants to quickly run to seed[27]. Summer crops do best in light shade to encourage more leaf production before the plant goes to seed[27], winter crops require a warm dry sunny position[1, 27]. Young plants are hardy to about -9°C[200]. Spinach is often cultivated for its edible leaves, there are some named varieties[132, 183]. These varieties can be grouped into two main types as detailed below- Forms with prickly seeds. These are the more primitive forms. Their leaves are more lobed and they are in general more cold tolerant and also more resistant of summer heat[264]. They were more often used to produce a crop in the winter[200, 264]. Forms with round seeds have been developed in cultivation. These have broader leaves, tend to be less cold hardy and were also more prone to bolt in hot weather[264]. They were used mainly for the summer crop[200]. Most new cultivars are of the round seeded variety and these have been developed to be more resistant to bolting in hot weather, more cold tolerant, to produce more leaves and also to be lower in calcium oxalate which causes bitterness and also has negative nutritional effects upon the body[264]. Some modern varieties have been developed that are low in oxalic acid. Edible leaves can be obtained all year round from successional sowings[200]. The summer varieties tend to run to seed fairly quickly, especially in hot dry summers and so you need to make successional sowings every few weeks if a constant supply is required. Winter varieties provide leaves for a longer period, though they soon run to seed when the weather warms up. Spinach grows well with strawberries[18, 20]. It also grows well with cabbages, onions, peas and celery[201]. A fast-growing plant, the summer crop can be interplanted between rows of slower growing plants such as Brussels sprouts. The spinach would have been harvested before the other crop needs the extra space[200]. Spinach is a bad companion for grapes and hyssop[201]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fleshy. Thick or swollen

- fibrous or tap root [2-1].

5.2.266 *Armoracia rusticana*

Horseradish, Red Cole

4 tlin 9 cyuc 3 kcaak 2 tcan 3 dwat 0.7 m hku
hmimhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikliw
wisslip hpa7tmwatli fyixre7t hjonli

drutta *Armoracia rusticana* is a PERENNIAL growing to 0.7 m (2ft 4in) by 0.8 m (2ft 7in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcasta Large quantities of this plant can be poisonous due to its content of volatile oils[76]. Traditional texts suggested possible thyroid function depression. Contraindicated with chronic nephritis, hepatitis, gastro-oesophageal reflux or hyperacidity conditions, and inflammatory bowel conditions. Avoid during pregnancy and lactation (moderate amounts with food ok)[301].

kcakta Edible Parts: Leaves Root SeedEdible Uses: CondimentYoung root - raw or cooked. The grated root is used to make the condiment 'Horseradish sauce'[2, 9, 13, 14, 27, 33, 34, 52], this has a hot mustard-like flavour[100]. The sauce is best used uncooked or gently warmed, heating it will destroy the volatile oils that are responsible for its pungency[238]. It is said that in Germany the roots are sliced and cooked like parsnips[183] - rather than me!K]. The root is a rich source of sulphur[201]. Fresh roots contain the glycoside sinigrin - this is decomposed in the presence of water by the enzyme myrosin, producing mustard oil which gives the root its hot flavour[268]. The fleshy roots can be up to 60cm long and 5cm thick[268]. The plant is fully hardy and can be left in the ground all winter to be harvested as required[4]. Alternatively, the roots can be harvested in early winter and stored for later use, they will retain their juicy state for some time if stored in dry sand[4]. Young leaves - raw or cooked[2, 9, 14, 177]. A very strong flavour, though nice when added in small quantities to the salad bowl[183, K]. A pleasant mild flavour according to another report[238]. Seeds - sprouted and eaten in salads[183].

tcanta Fungicide RepellentHorseradish tea is effective against brown rot of apples and other fungicidal diseases[18, 201]. The growing plant deters potato eelworm[14].

dwatta Antibacterial Antirheumatic Antiseptic Aperient Digestive Diuretic Expectorant Rubefacient Stimulant UrinaryHorseradish is a very pungent stimulant herb that controls bacterial infections and can be used both internally and externally[238]. The plant is a powerful stimulant, whether used internally as a spur for the digestive system or externally as a rubefacient[4]. It should not be used internally by people with stomach ulcers or thyroid problems[238]. The roots are antiseptic, aperient, digestive, diuretic, expectorant, rubefacient and stimulant[4, 13, 14, 165, 171, 222]. They should be used in their fresh state[4]. An infusion is used in the treatment of colds, fevers and flu and is of value in the treatment of respiratory and urinary tract infections[254]. A sandwich of the freshly grated root is a traditional remedy for hay fever[254]. A tea made from the root is weakly diuretic, antiseptic and expectorant[222]. The plant is antibiotic against gram-negative and gram-positive bacteria and also pathogenic fungi[22, 240]. It is experimentally antitumor[222]. Externally, a poultice made from the roots is used to treat pleurisy, arthritis and infected wounds[238]. It will also relieve the pain of chilblains[244]. Some caution should be employed, however, because it can cause blistering[254]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve *Armoracia rusticana* for internal and external use in catarrhs of the respiratory tract, internally as supportive therapy for urinary tract infections, externally for the hyperaemic treatment of minor muscles aches (see [302] for critics of commission E).

nrakta Europe. Naturalized in Britain[17]. ksacta Arable land, waste ground and by streams[9], favouring slightly damp positions[165].

propta Seed - this is seldom produced on plants in cultivation[200]. If seed is obtained then it is best sown in situ during the spring[238]. Division is very easy and can be carried out at almost any time of the year, though it is probably best in spring[33]. It s best to use sections of root about 20cm long, which can be planted out into their permanent positions in February or March, though even very small bits of root will grow away[4, 264]. Division should be carried out at least once every three years or the crop will deteriorate[4].

nwatta Landscape Uses:Massing, Seashore. A very easily grown plant, horseradish prefers a good deep moist well-drained soil and a sunny position[16, 27, 33, 200]. Plants require a good soil if they are to produce good roots[4], though once established they are very tolerant of neglect and will continue to produce a crop for many years[264, K]. Plants do not thrive if they are in the shade of trees[264]. Excess nitrogen causes heavy top growth and forking of the roots[200]. Prefers a wet clay soil according to one report[14], whilst another says that it will not grow in wet clay[16]. Tolerates a pH in the range 5.8 to 8.3. Horseradish has long been cultivated for its root which is used as a food flavouring and medicinally, there are some named varieties[4, 17, 61, 183]. If the roots are given some protection they will produce fresh young leaves for the salad bowl all through the winter. Digging up some roots and putting them into a greenhouse for the winter is the easiest method. If the young shoots are blanched they will produce white, tender, sweet leaves[183]. A very invasive plant[33], it is considered to be a pernicious weed in some areas[200]. Even quite small sections of root will regrow if they are left in the soil[4]. The plant has yet to prove invasive on our Cornwall trial grounds, though it has survived and even prospered in a very overgrown site[K]. The forms of this plant grown in gardens are almost sterile and seldom produce good seed[264]. This is a good companion plant for potatoes since it is said to deter potato eelworm[14, 18, 201] and the Colorado beetle[238]. One plant at each corner of the potato patch is quite sufficient[201]. When grown under apple trees it is said to prevent brown rot, powdery mildew and other fungal diseases[201]. Special Features:Fragrant foliage, Not North American native, Invasive, Naturalizing, Fragrant flowers. The plant is heat tolerant in zones 12 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone, 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

5.2.267 *Heracleum sphondylium montanum*

Cow Parsnip

4 tlin 8 cyuc 3 kcaak 0 tcan 2 dwat m hku
pcimhmimhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikliw
hpa7tmwatli fyixre7t hjonli

drutta *Heracleum sphondylium montanum* is a PERENNIAL growing to 2.4 m (7ft 10in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in July, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

pcasta Many members of this genus, including this species[65], contain furanocoumarins. These have carcinogenic, mutagenic and phototoxic properties. The fresh foliage can cause dermatitis[21]. If the juice and hairs of the outer skin are left on the face and mouth, they can cause blis-

can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame[11, 113]. Put up in the spring[113]. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78].

nwatta Prefers a warm moist loamy soil and light shade but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. Hybridizes freely with other members of this genus[1]. Closely related to *B. tsangpoensis*[11]. Plants can be pruned back quite severely, they resprout well from the base[200].

5.2.287 *Angelica atropurpurea*

Purplestem Angelica

4 tlin 8 cyuc 2 kcaak 0 tcan 2 dwat 3 m hku
hmimhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikliw
hpa7tmwatli fyixre7t hjonli

drutta *Angelica atropurpurea* is a PERENNIAL growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcasta All members of this genus contain furanocoumarins, which increase skin sensitivity to sunlight and may cause dermatitis[238].

kcakta Edible Parts: Leaves Root StemEdible Uses: Young shoots and leaf stalks - raw or cooked[55, 105, 177]. When boiled in two lots of water they form a vegetable that strongly resembles celery. They can be peeled and eaten in salads or blanched and cooked like asparagus[183]. The stems can also be candied and used as a sweetmeat[2]. Root, leafstalks and stems - candied[177, 183].

dwatta Carminative Diaphoretic Emmenagogue Sedative Stomachic TonicA tea made from the leaves is carminative and stomachic[222]. It is also used in the treatment of colds, rheumatism etc[222]. The seed and roots can also be used and have a stronger effect[222]. The plant has similar properties to angelica, *A. archangelica*, though it is inferior since it is less aromatic[4]. The root is carminative, diaphoretic, emmenagogue, sedative, stomachic and tonic[257]. An infusion has been used in the treatment of fevers, colds, flatulent colic and other stomach disorders, obstructed menses and as a general tonic for women[257]. Externally it has been used as a gargle for sore throats and mouths and as a poultice for broken bones, swellings etc[257]. It has also been used, both internally and externally, as a treatment for rheumatism[257].

nrakta Eastern N. America - Newfoundland to Ontario and Minnesota, south to Delaware, Illinois and Iowa. ksacta Rich thickets, bottomlands and swamps[43].

propta Seed - best sown in a cold frame as soon as it is ripe since the seed only has a short viability[200]. Seed can also be sown in the spring, though germination rates will be lower. It requires light for germination[200]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter, planting them out into their permanent positions in the spring. The seed can also be sown in situ as soon as it is ripe.

nwatta Requires a deep moist fertile soil in dappled shade or full sun[200]. Plants are reliably perennial if they are prevented from setting seed[200].

5.2.288 *Quercus undulata*

Wavyleaf Oak

4 tlin 8 cyuc 2 kcaak 0 tcan 2 dwat 3 m hku
hmimhtut cyutli tcup hwicli jutnyik hpa7tli flatprikliw
hpa7tmwatli hjonli

drutta *Quercus undulata* is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy

to UK zone 5 and is not frost tender. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: CoffeeSeed - raw or cooked[61, 105, 161, 257]. Up to 2cm long[200]. It can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed contains bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute[257].

tcanta Fuel Repellent Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. Oak galls are excrecences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. Tannin is obtained from the bark[46, 61]. Wood. Used mainly as a fuel[46, 61].

dwatta Analgesic Astringent DysenteryA decoction of the root bark has been used to treat internal pains[257]. Any galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta South-western N. America - Colorado to Texas, south to Mexico. ksacta Sandstone soils and dry rocky slopes[228].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. Prefers warmer summers than are usually experienced in Britain, trees often grow poorly in this country and fail to properly ripen their wood resulting in frost damage overwinter[200]. The seed ripens in its first year[200]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200].

5.2.289 *Rumex crispus*

Curled Dock, Curly dock

4 tlin 8 cyuc 2 kcaak 2 tcan 3 dwat 0.6 m hku
hmimhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikliw
hpa7tmwatli xre7t hjonli

drutta *Rumex crispus* is a PERENNIAL growing to 0.6 m (2ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to October, and the seeds ripen from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

position but succeeds in partial shade, though it fruits less well in such a situation[200]. This species is resistant to drought and cold temperatures[266]. This species is closely related to *M. toringoides*[200]. It hybridizes freely with other members of the genus[200]. The fruit is a good wildlife food source, especially for birds[200]. Plants in this genus are notably susceptible to honey fungus[200].

5.2.284 *Peucedanum ostruthium*

Masterwort

4 tlin 8 cyuc 2 kcaok 0 tcan 2 dwat 1.2 m hkuic hmimhtut cyutli tcup hwicli hrasjnutnyik hpa7tli flatprikklwis hpa7tmwatli fyifxre7t hjonli

drutta *Peucedanum ostruthium* is a PERENNIAL growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcasta Skin contact with the sap of this plant is said to cause photo-sensitivity and/or dermatitis in some people[65, 218]. It is also said to contain the alleged 'psychotroph' myristicine[218].

kcaakta Edible Parts: LeavesEdible Uses: CondimentLeaves - cooked[2, 115, 177]. Used as a potherb or as a flavouring[61, 183]. The aromatic roots can be used as a flavouring[183]. They are said to taste hotter than pepper[4]. A particularly popular drink is made from the fermented roots[7].

dwatta Antispasmodic Aromatic Bitter Carminative Diaphoretic Digestive Diuretic Emmenagogue Expectorant Febrifuge Homeopathy Odontalgic Skin Stimulant StomachicMasterwort is little used in modern herbalism, but it may well be a herb that bears further investigation[254]. It was held in high regard in the Middle Ages where it was especially valued for its ability to resolve all flatulence in the body and stimulate the flow of urine and menstruation[254]. It was also used in treating rheumatic conditions, shortness of breath, kidney and bladder stones, water retention and wounds[254]. The root is antispasmodic, aromatic, bitter, strongly carminative, diaphoretic, digestive, diuretic, emmenagogue, expectorant, febrifuge, stimulant and stomachic[4, 7, 9, 21, 254]. It is of use in the treatment of asthma, dyspepsia and menstrual complaints[4], an infusion helps to relieve migraine[7]. The root is gathered in the spring or autumn and dried for later use[7, 9]. An essential oil from the plant has a euphoric and odontalgic effect[7]. Used externally, it relieves skin irritation[7]. When used externally, the plant or the extracted essential oil can cause an allergic reaction to sunlight[254]. A homeopathic remedy is made from the roots[9]. No details of its applications are given[K].

nrakta S. Europe. Naturalized in Britain. ksacta Woodland, damp fields, river banks and mountain meadows[17, 50].

propta Seed - we have no information on this species but suggest sowing the seed in a cold frame as soon as it is ripe if this is possible otherwise in early spring. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer.

nwatta An easily grown plant, it succeeds in any moisture-retentive soil in a sunny position[200]. Dislikes shade. This report contradicts the report that this plant grows wild in woodlands. Masterwort was at one time cultivated as a pot herb and for medicinal purposes, though it has now fallen into virtual disuse[4, 200]. Suitable for group plantings in the wild garden[200].

5.2.285 *Eleutherococcus sessiliflorus*

4 tlin 8 cyuc 2 kcaok 0 tcan 3 dwat 4.5 m hkuic hmimhtut cyutli tcup hwicli hrasjnutnyik hpa7tli flatprikklwis hpa7tmwatli xre7t hjonli

drutta *Eleutherococcus sessiliflorus* is a deciduous Shrub growing to 4.5 m (14ft 9in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from July

to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. It can tolerate atmospheric pollution.

kcaakta Edible Parts: LeavesEdible Uses: Drink TeaYoung leaves - raw or cooked and used as a vegetable[105, 177, 183]. Old leaves are dried and used as a tea substitute[105, 177, 183]. A wine is made from the bark. It is highly fancied by the Chinese[183]. It is probably used mainly for medicinal purposes[K].

dwatta Adaptogen Analgesic Antiinflammatory Antipyretic DiureticThe root bark contains saponins, acanthosides, cardiac glycosides and polysaccharides[279]. It is adaptogenic, analgesic, anti-inflammatory, antipyretic and diuretic[176, 218, 279]. It is used in Korea in the treatment of lumbago, neuralgia, arthritis and oedema[279].

nrakta E. Asia - China, Korea, Manchuria. ksacta Moist woods, wooded riverbanks, forest edges and clearings[51, 174].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame[200]. It can be slow to germinate. Stored seed requires 6 months warm followed by 3 months cold stratification[113] and can be very slow to germinate[133]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for at least the first winter. Plant out in late spring or early summer. Cuttings of half-ripe wood, July/August in a frame[113, 200]. Cuttings of ripe wood of the current season's growth, 15 - 30cm long in a cold frame[238]. Root cuttings in late winter[200]. Division of suckers in the dormant season[200].

nwatta Succeeds in an open loamy soil[1], preferring a well-drained humus-rich soil in full sun[200]. Tolerates poor soils and atmospheric pollution[200]. A very cold resistant plant[74] if it is sheltered from cold winds, tolerating temperatures down to at least -15°C[200]. A very ornamental plant[74], it spreads vigorously by means of suckers[200]. This species is closely related to *E. divaricatus*[200].

5.2.286 *Berberis everstiana*

4 tlin 8 cyuc 2 kcaok 0 tcan 2 dwat 1.5 m hkuic hmimhtut cyutli kyuctcup hwicli hyishrasjnutnyik hpa7tli flatprikklwis hpa7tmwatli fyifxre7t hjonli

drutta *Berberis everstiana* is a SHRUB growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to June, and the seeds ripe from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcaakta Edible Parts: FruitEdible Uses: Fruit - raw[272]. The fleshy oblong fruit is about 15mm long.

tcanta DyeA yellow dye is obtained from the root and bark.

dwatta Antibacterial Cancer Dysentery Ophthalmic StomachicBerberine, universally present in rhizomes of *Berberis* species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with *Glycyrrhiza* species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta E. Asia - northern India, Nepal and Tibet. ksacta Open rocky places at elevations of 3000 - 4000 metres in Nepal[272].

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it

ters[212]. This effect is especially prevalent for people with fair complexions[256].

kcaakta Edible Parts: Flowers Leaves Root StemEdible Uses: Condiment SaltRoot - cooked[2, 46, 85, 94]. Tastes like a swede[155, 183]. Used like potatoes, though it is considered to be poisonous by some writers[213]. The peeled stem can be eaten raw but is best cooked[2, 61, 183]. The unpeeled stem can be used when young, or just the inner tissue of older stems can be used, before the plants flower[85, 94]. For people not used to the flavour, they are best cooked in two changes of water when they make a tasty celery-like vegetable[213]. Another report says that, despite the strong odour of the leaves and outer skin, the peeled young stems are mild and sweet, resembling celery in flavour[256]. The stems cannot be eaten raw in large quantities because they give a burning sensation in the mouth[257]. The stems are highly nutritious, containing up to 18% protein[213]. Leaves and young shoots - raw or cooked[55, 85, 94, 118]. Cooked as greens or added to salads[183]. Young flowers[46, 61, 105]. No further details. The dried seeds are used as a flavouring for soups, stews and potato salads[85, 183]. The dried base of the plant and ashes from the burnt leaves are used as a salt substitute[183].

tcanta Dye Musical Packing Repellent StrawWhistles, flutes, straws etc can be made from the hollow stems[99, 257]. The leaves are used as a covering for baskets of fruit etc[99]. A yellow dye is obtained from the roots[257]. An infusion of the blossoms, rubbed on the body, repels flies and mosquitoes[257].

dwatta Antidandruff Antirheumatic Antispasmodic Carminative Epilepsy Febrifuge Odontalgic Stimulant TB TonicCow parsnip was widely employed medicinally by a large number of native North American Indian tribes who used it to treat a wide variety of complaints, but especially as a poultice on bruises, sores etc[257]. It is little used in modern herbalism, though perhaps it merits further investigation. All parts of the plant are antirheumatic, antispasmodic, carminative, febrifuge, odontalgic and stimulant[21, 94, 155, 172, 257]. The leaves are tonic[257]. They have been used in the treatment of colds[257]. A soothing drink made from the leaves is used to treat sore throats[257]. A poultice of the heated leaves has been applied to minor cuts, sore muscles etc[257]. An infusion of the fresh young stems has been used in the treatment of diarrhoea[257]. It has also been used as a wash to remove warts[257]. The plant has been used in the treatment of epilepsy[213]. A tea made from the roots is used in the treatment of indigestion, colds, stomach cramps, rheumatism, sore throats, TB etc[222, 257]. Externally the root is used as a poultice on sores, bruises, swellings, boils, rheumatic joints, VD scabs etc, whilst a bit of root has been held on an aching tooth to reduce the pain[222, 257]. The root can be crushed, mixed with water and used as an antidandruff hair wash[257]. The root contains psoralen, which is being investigated for its use in the treatment of psoriasis, leukaemia and AIDS[222]. The seed has been used to treat severe headaches[257].

nrakta N. America to W. Asia. ksacta Rich damp soils of prairies and mountains, especially along streams and in open woods in Western N. America[212].

propta Seed - sow mid to late spring or early autumn in situ. Division in autumn.

nwatta Succeeds in any ordinary garden soil, doing best in moist soils or deep woodland[1, 55, 60].

5.2.268 *Monarda didyma*

Bergamot, Scarlet beebalm, Horsement, Oswego Tea, Bee Balm

4 tlin 10 cyuc 3 kcaok 3 tcan 2 dwat 0.9 m hkuic hmimhtut cyutli tcup hwicli hrasjnutnyik hpa7tli flatprikklwis hpa7tmwatli fyifxre7t hjonli

drutta *Monarda didyma* is a PERENNIAL growing to 0.9 m (3ft) by 0.5 m (1ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in leaf from April to October, in flower from June to September, and the seeds ripe from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly

alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcaakta Edible Parts: Flowers Leaves ShootsEdible Uses: Condiment TeaLeaves and young shoot tips - raw or cooked. They are used as a flavouring in salads, fruit salads, drinks etc[46, 61, 105, 183]. Flowers - raw. They are added as an attractive garnish to salads[183, 238, 244]. An excellent aromatic tea is made from the fresh or dried leaves and flower heads[21, 46, 105, 183]. The leaves give an Earl Grey flavour to China tea[238].

tcanta Companion Essential Pot-pourriLandscape Uses: Border, Container, Massing, Rock garden, Specimen. Attracts birds, North American native, Edible, Fragrant foliage, Invasive, Naturalizing, Attracts butterflies, Suitable for cut flowers, Suitable for dried flowers, Fragrant flowers. Yields an essential oil, used in perfumery, as a hair tonic etc[46, 61]. The dried leaves and flowers are used to scent and add colour to pot-pourri[238]. Brings hummingbirds.

dwatta Anthelmintic Carminative Diuretic Expectorant Febrifuge Rubefacient Stimulant UrinaryBergamot is often used as a domestic medicine, being particularly useful in the treatment of digestive disorders. The leaves and flowering stems are anthelmintic, carminative, diuretic, expectorant, febrifuge, rubefacient and stimulant[4, 222]. An infusion is used in the treatment of flatulent colic and sickness, it is also used as a diuretic to treat urinary disorders[4, 238]. The leaves can be harvested before the plant flowers, or they can be harvested with the flowering stems. They can be used fresh or dried[238]. An essential oil from the herb is mainly used externally as a rubefacient in the treatment of rheumatism etc[4].

nrakta Eastern N. America - New York to Michigan, south to Georgia and Tennessee. ksacta Moist soils[235] in rich woods, thickets and bottom lands[43].

propta Seed - sow mid to late spring in a cold frame. Germination usually takes place within 10 - 40 days at 20°C. When large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in early summer. The seed can also be sown in situ in late summer in areas where the winters are not too severe and will produce larger plants. Cuttings of soft basal shoots in spring. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer. Division in spring or autumn. Very easy, large divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Easily grown in ordinary garden soil so long as it is not too dry[1, 200]. Grows well in heavy clay soils. Requires a moist soil and a sunny position[4, 200]. Prefers some shade[4] but succeeds in a sunny position so long as the soil does not dry out. Provide light shade in hotter zones. Plants are hardy to at least -25°C[187]. The flowers are rich in nectar and are very attractive to bees[4, 55, 244]. A good companion plant, it grows well with tomatoes[14, 20]. Bergamot is a very ornamental and aromatic plant, it is often grown in the herb garden, there are some named varieties[183, 233]. The leaves, stems and roots carry a delicious aromatic orange-like perfume when crushed[245]. Plants are subject to mildew in dry summers[200]. Special Features: The plant is heat tolerant in zones 10 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

5.2.269 *Mentha arvensis villosa*

American Wild Mint

4 tlin 8 cyuc 3 kcaak 0 tcan 2 dwat 0.6 m hkuc
hmmihtut cyutli tcup hwicli hrasljutnyikfrip hpa7tli flatprikli-
wis hpa7tmwatli xre7t hjonli

drutta *Mentha arvensis villosa* is a PERENNIAL growing to 0.6 m (2ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

kcakta Edible Parts: LeavesEdible Uses: Condiment TeaLeaves - raw or cooked. Fragrant and pleasant tasting, the leaves are used as a flavouring in salads or cooked foods[183, 257]. A herb tea is made from the leaves[183, 257].

tcanta Essential Repellent StrewingThe plant is used as an insect repellent[18, 20, 99]. Rats and mice intensely dislike the smell of mint. The plant was therefore used in homes as a strewing herb and has also been spread in granaries to keep the rodents off the grain[244]. An essential oil is obtained from the leaves, it is used as a flavouring for tooth-pastes etc[61]. It contains thymol and pulegone[213].

dwatta Antiseptic Carminative FebrifugeStomachicAmerican wild mint, like many other members of this genus, is often used as a domestic herbal remedy, being valued especially for its antiseptic properties and its beneficial effect on the digestion. Like other members of the genus, it is best not used by pregnant women because large doses can cause an abortion. A decoction of the ground leaves and stems is used to treat feelings of nausea[213]. The tea is also used in the treatment of colds, fevers, sore throats, gas, colic, indigestion etc[222]. The leaves are harvested as the plant comes into flower and can be dried for later use[238]. The essential oil in the leaves is antiseptic, though it is toxic in large doses[222].

nrakta N. America - New Brunswick to Manitoba, British Columbia, Virginia, New Mexico and Nevada. ksacta Moist places at low to moderate elevations[204].

propta Seed - sow spring in a cold frame. Germination is usually fairly quick. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. *Mentha* species are very prone to hybridisation and so the seed cannot be relied on to breed true. Even without hybridisation, seedlings will not be uniform and so the content of medicinal oils etc will vary. When growing plants with a particular aroma it is best to propagate them by division[K]. Division can be easily carried out at almost any time of the year, though it is probably best done in the spring or autumn to allow the plant to establish more quickly. Virtually any part of the root is capable of growing into a new plant. Larger divisions can be planted out direct into their permanent positions. However, for maximum increase it is possible to divide the roots up into sections no more than 3cm long and pot these up in light shade in a cold frame. They will quickly become established and can be planted out in the summer.

nwatta An easily grown plant, it succeeds in most soils and situations so long as the soil is not too dry[1, 16, 200]. This species tolerates much drier conditions than other members of the genus[238]. Prefers a slightly acid soil[16]. Grows well in heavy clay soils. A sunny position is best for production of essential oils, but it also succeeds in partial shade. Plants are hardy to at least -15°C[238]. Most mints have fairly aggressive spreading roots and, unless you have the space to let them roam, they need to be restrained by some means such as planting them in containers that are buried in the soil[K]. The whole plant has a very strong smell of mint[245]. Hybridizes freely with other members of this genus. The flowers are very attractive to bees and butterflies[24]. A good companion plant for growing near brassicas and tomatoes, helping to deter insect pests[20]. Members of this genus are rarely if ever troubled by browsing deer[233].

5.2.270 *Cardamine hirsuta*

Hairy Bittercress

4 tlin 8 cyuc 3 kcaak 1 tcan 0 dwat 0.3 m hkuc
hmmihtut cyutli tcup hwicli hyshrasljutnyik hpa7tli flatprikli-
wis hpa7tmwatli fyfkrre7t hjonli

drutta *Cardamine hirsuta* is an ANNUAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to August, and the seeds ripen from May to September. The species is hermaphrodite (has both male and female organs). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers LeavesEdible Uses: Leaves and flowers - raw or cooked[2, 5, 52, 53, 105]. A hot cress-like flavour, they are mainly used as a garnish or flavouring in salads etc[132] but are also sometimes used as a potherb[183]. The plant germinates most freely in the autumn and so leaves are usually available all winter[244].

tcanta The tiny flowers are attractive to a few early butterflyflies, including (in the United States) spring azure (*Celastrina ladon*) and falcate orange-tip (*Anthocharis midaea*).

nrakta Throughout most of the northern Hemisphere, including Britain. ksacta Open and cultivated ground, rocks, scree, walls etc[17].

propta Seed - sow spring or autumn in situ. This species needs very little encouragement and is quite capable of sowing itself, often too freely.

nwatta Prefers a moist humus rich soil in shade or semi-shade[200] but it succeeds in most soils and positions[1]. A common garden weed, it can be in flower all year round if the weather is mild. It will usually self-sow very freely in cultivated soil and is found especially in pot-grown plants[K].

5.2.271 *Taxus x media*

Anglojapanese Yew

4 tlin 7 cyuc 3 kcaak 4 tcan 4 dwat m hkuc
pcimhmmihtut cyutli kyuctcup hwicli hrasljutnyik hpa7tli frusflatprikliwisslip hpa7tmwatli nyanhjen hjonli

drutta *Taxus x media* is an evergreen Shrub growing to 6 m (19ft) by 6 m (19ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf all year, and the seeds ripen from September to November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

pcista All parts of the plant, except the flesh of the fruit, are highly poisonous[1, 4, 7, 10, 19, 65].

kcakta Edible Parts: FruitEdible Uses: Fruit - raw[K]. Very sweet and gelatinous, most people find it delicious though some find it sickly[K]. The fruit is a fleshy berry about 10mm in diameter and containing a single seed[200]. All other parts of this plant, including the seed, are highly poisonous. When eating the fruit you should spit out the large seed found in the fruit's centre. Should you swallow the whole seed it will just pass straight through you without harm, if the seed has been bitten into, however, it could cause some problems.

tcanta WoodWood - strong, hard, heavy. Used for paddles, fence posts etc.

dwatta Modern research has shown that yew trees contain the substance 'taxol' in their shoots and bark. Taxol has shown exciting potential as an anti-cancer drug, particularly in the treatment of ovarian cancers[222, 238]. This remedy is very toxic and, even when used externally, should only be used under the supervision of a qualified practitioner[238]. See also the notes above on toxicity.

fungus[200]. Special Features: Attractive foliage, Not North American native, Inconspicuous flowers or blooms.

5.2.282 *Polygonum aviculare*

Knotweed, Prostrate knotweed

4 tlin 8 cyuc 2 kcaak 0 tcan 3 dwat 0.3 m hkuc
hmmihtut cyutli tcup hwicli hrasljutnyik hpa7tli frusflatprikli-
wis hpa7tmwatli fyfkrre7t hjonli

drutta *Polygonum aviculare* is an ANNUAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to October, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

pcista Although no specific mention has been made for this species, there have been reports that some members of this genus can cause photosensitivity in susceptible people. Many species also contain oxalic acid (the distinctive lemony flavour of sorrel) - whilst not toxic this substance can bind up other minerals making them unavailable to the body and leading to mineral deficiency. Having said that, a number of common foods such as sorrel and rhubarb contain oxalic acid and the leaves of most members of this genus are nutritious and beneficial to eat in moderate quantities. Cooking the leaves will reduce their content of oxalic acid. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Edible Parts: Leaves SeedEdible Uses: TeaYoung leaves and plants - raw or cooked[105, 177]. Used as a potherb[183], they are very rich in zinc[179]. A nutritional analysis is available[218]. Seed - raw or cooked. Rather small and fiddly to utilize, they can be used in all the ways that buckwheat (*Fagopyrum esculentum*) is used, either whole or dried and ground into a powder for use in pancakes, biscuits and piñole[4, 55, 106, 161, 183]. The leaves are a tea substitute[183].

tcanta DyeYields a blue dye that is not much inferior to indigo[115]. The part used is not specified, but it is likely to be the leaves. Yellow and green dyes are obtained from the whole plant[168]. The roots contain tannins, but the quantity was not given[223].

dwatta Anthelmintic Antiphlogistic Astringent Cardiotonic Cholagogue Diuretic Dysentery Emetic Emollient Expectorant Febrifuge Haemostatic Lithontripic Purgative TB Vasoconstrictor UreteraryKnotweed is a safe and effective astringent and diuretic herb that is used mainly in the treatment of complaints such as dysentery and haemorrhoids. It is also taken in the treatment of pulmonary complaints because the silicic acid it contains strengthens connective tissue in the lungs[254]. The whole plant is anthelmintic, astringent, cardiotonic, cholagogue, diuretic, febrifuge, haemostatic, lithontripic and vulnerary[4, 7, 9, 21, 53, 147, 172, 176, 178]. It was formerly widely used as an astringent both internally and externally in the treatment of wounds, bleeding, piles and diarrhoea[4]. Its diuretic properties make it useful in removing stones[4]. An alcohol-based preparation has been used with success to treat varicose veins of recent origin[7]. The plant is harvested in the summer and early autumn and is dried for later use[9]. The leaves are anthelmintic, diuretic and emollient[218]. The whole plant is anthelmintic, antiphlogistic and diuretic[218]. The juice of the plant is weakly diuretic, expectorant and vasoconstrictor[218]. Applied externally, it is an excellent remedy to stay bleeding of the nose and to treat sores[4]. The seeds are emetic and purgative[4, 240]. Recent research has shown that the plant is a useful medicine for bacterial dysentery. Of 108 people with this disease, 104 recovered within 5 days when treated internally with a paste of knotweed[254].

nrakta Throughout Europe, including Britain, to Temperate Asia. ksacta Waste places, roadsides, railway embankments and the coast[9]. A common garden weed[1].

propta Seed - sow spring in a cold frame. Germination is usually free and easy. When they are large enough to handle, prick the seedlings out into individual pots and plant them

out in the summer if they have reached sufficient size. If not, overwinter them in a cold frame and plant them out the following spring after the last expected frosts. Division in spring or autumn. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Succeeds in an ordinary garden soil[1] but prefers a moisture retentive not too fertile soil in sun or part shade[200]. Repays generous treatment, in good soils the plant will cover an area up to a metre in diameter[1, 4]. Prefers an acid soil[20]. Dislikes shade. Knotweed is a common and invasive weed of cultivated ground[7]. It is an important food plant for the caterpillars of many species of butterflies[30]. It also produces an abundance of seeds and these are a favourite food for many species of birds[4]. Plants seem to be immune to the predations of rabbits[233]. The flowers have little or no scent or honey and are rarely visited by pollinating insects. Self-fertilization is the usual method of reproduction, though cross-fertilization by insects does sometimes occur[4]. The plant also produces cleistogamous flowers - these never open and therefore are always self-fertilized[4]. The plant is very variable and is seen by most botanists as an aggregate species of 4 very variable species, viz. - *P. aviculare*. L.; *P. boreale*. (Lange.)Small.; *P. rivivacuum*. Jord. ex Box.; and *P. arenastrum*. Box[17].

5.2.283 *Malus transitoria*

4 tlin 8 cyuc 2 kcaak 0 tcan 0 dwat 8 m hkuc
hmmihtut cyutli tcup hwicli hrasljutnyikfrip hpa7tli flatprikli-
wis hpa7tmwatli xre7t hjonli

drutta *Malus transitoria* is a deciduous Tree growing to 8 m (26ft) by 10 m (32ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177]. About 15mm in diameter[200]. The fruits on our trees in Cornwall are a bit larger, up to 25mm in diameter[K]. The flavour is acid and astringent, but tolerable, in mid-October. It improves once the fruit has been frosted and so it is best to delay harvesting as long as possible[K].

tcanta RootstockThis species has been used as stock to graft apple trees in NE and NW Shaanxi[266].

nrakta E. Asia - China. ksacta Thickets on slopes or hills of the Loess Plateau at elevations of 1500 - 3900 metres[266].

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

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny

drutta Papaver rhoeas is a ANNUAL growing to 0.6 m (2ft) by 0.2 m (0ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista This plant is toxic to mammals, though the toxicity is low[76]. The seed is not toxic[76].

kcakta Edible Parts: Flowers Leaves Oil SeedEdible Uses: Colouring OilSeed - raw or cooked. Much used as a flavouring in cakes, bread, fruit salads etc[4, 5, 21, 183], it imparts a very nice nutty flavour[K]. The seeds are rather small, but they are contained in fairly large seed pods and so are easy to harvest. The seeds are perfectly safe to eat, containing none of the alkaloids associated with other parts of the plant[238]. Leaves - raw or cooked[7, 52]. Used like spinach or as a flavouring in soups and salads[132, 183]. The leaves should not be used after the flower buds have formed[7]. Some caution is advised, see the notes above on toxicity. An edible oil is obtained from the seed[2, 4]. Said to be an excellent substitute for olive oil[4, 183], it can be used in salad dressings or for cooking[2]. A syrup can be prepared from the scarlet flower petals, it is used in soups, gruels etc[4, 183]. A red dye from the petals is used as a food flavouring, especially in wine[183].

tcanta Dye Ink Oil Pot-pourriA red dye is obtained from the flowers[7, 46, 61], though it is very fugitive[4]. A syrup made from the petals has been used as a colouring matter for old inks[4, 13, 89]. The red petals are used to add colour to pot-pourri[238].

dwatta Anthodine Cancer Emmenagogue Emollient Expectorant Hypnotic Sedative TonicThe flowers of corn poppy have a long history of medicinal usage, especially for ailments in the elderly and children[244, 254]. Chiefly employed as a mild pain reliever and as a treatment for irritable coughs, it also helps to reduce nervous over-activity[254]. Unlike the related opium poppy (*P. somniferum*) it is non-addictive[244]. However, the plant does contain alkaloids, which are still under investigation, and so should only be used under the supervision of a qualified herbalist[244]. The flowers and petals are anodyne, emollient, emmenagogue, expectorant, hypnotic, slightly narcotic and sedative[4, 7, 9, 13, 46, 53]. An infusion is taken internally in the treatment of bronchial complaints and coughs, insomnia, poor digestion, nervous digestive disorders and minor painful conditions[9, 238]. The flowers are also used in the treatment of jaundice[218]. The petals are harvested as the flowers open and are dried for later use[238]. They should be collected on a dry day and can be dried or made into a syrup[4]. The latex in the seedpods is narcotic and slightly sedative[240]. It can be used in very small quantities, and under expert supervision, as a sleep-inducing drug[7]. The leaves and seeds are tonic[240]. They are useful in the treatment of low fevers[240]. The plant has anticancer properties[218].

nrakta Europe, including Britain, from Scandinavia south and east to N. Africa and temperate Asia. ksacta A common weed of cultivated land and waste places, avoiding acid soils[17]. Becoming far less frequent on cultivated land due to modern agricultural practices.

propta Seed - sow spring or autumn in situ[200].

nwatta Landscape Uses:Border, Massing, Seashore, Specimen. Prefers a well-drained sandy loam in a sunny position[1, 200]. Does not do well on wet clay soils but succeeds in most other soils[115]. Plants usually self-sow freely when growing in suitable conditions so long as the soil surface is disturbed[238]. There are several named varieties selected for their ornamental value[200]. A polymorphic species, varying in leaf shape and flower colour[17]. When growing in cereal fields, poppies decrease the yields of nearby cereal plants[18, 20]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Special Features: Attractive foliage, Not North American native, Naturalizing, All or parts of this plant are poisonous, Suitable for cut flowers, Suitable for dried flowers.

5.2.281 Picea omorika

Serbian Spruce

4 tlin 7 cyuc 2 kcaok 0 tcan 0 dwat 25 m hkuc htut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli frusflatprikli-wissliip hpa7tmwatli hjonli

drutta Picea omorika is an evergreen Tree growing to 25 m (82ft) by 5 m (16ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf all year, in flower in May, and the seeds ripen from October to November. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It cannot grow in the shade. It prefers moist or wet soil. The plant can tolerate strong winds but not maritime exposure. It cannot tolerate atmospheric pollution.

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

tcanta Shelterbelt WoodModerately wind resistant, it is sometimes planted in shelterbelts. Wood. It is valued for its use in the pulp industry to make paper[171].

nrakta Europe - Serbia. ksacta Plants are confined to a few stands on limestone mountains[11].

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

nwatta Landscape Uses:Pest tolerant, Screen, Specimen. Likes abundant moisture at the roots, if grown in drier areas it must be given a deep moist soil[1]. Tolerates poor peaty soils[200]. Succeeds in wet cold and shallow soils but is not very wind-firm in shallow soils[1]. Prefers a pH between 4 to 6 but it also succeeds in pure chalk soils[200]. Dislikes shade[200]. Intolerant of atmospheric pollution[11]. Resists wind exposure to some degree[200]. In some upland areas, especially over granitic or other base-poor soils, growth rate and health have been seriously affected by aluminium poisoning induced by acid rain[200]. Plants are strongly outbreeding, self-fertilized seed usually grows poorly[200]. They hybridize freely with other members of this genus[200]. There are a number of named forms selected for their ornamental value, most of these are dwarf cultivars[200]. A fast growing tree from its second year of growth. Two to three years after planting out new shoots 1 metre long may be produced[185]. Growth takes place from mid-May to the end of July. Height increase is moderate over a long term basis, averaging around 50cm a year[185]. Trees should be planted into their permanent positions when they are quite small, between 30 and 90cm. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200]. Occasionally planted as a timber tree in Britain, it produces almost the same bulk of timber as the Norway spruce (*Picea abies*) but is more frost tolerant and can be grown in frosty hollows[185] because it comes into leaf quite late and it is not damaged by late frosts[11]. This species is widely cultivated as a timber tree in regions too dry or liable to late frosts for *P. sitchensis* to do well[200]. This species is notably susceptible to honey

nrakta A hybrid species of garden origin, *T. baccata* x *T. cuspidata*. ksacta Not known in the wild.

propta Seed - can be very slow to germinate, often taking 2 or more years[78, 80]. It is best sown as soon as it is ripe in the autumn when it should germinate 18 months later. Stored seed may take 2 years or more to germinate. 4 months warm followed by 4 months cold stratification may help reduce the germination time[113]. Harvesting the seed 'green' (when fully developed but before it has dried on the plant) and then sowing it immediately has not been found to reduce the germination time because the inhibiting factors develop too early[80]. Prick out the seedlings into individual pots once they are large enough to handle and grow them on in pots in a cold frame. The seedlings are very slow-growing and will probably require at least 2 years of pot cultivation before being large enough to plant out. Any planting out is best done in late spring or early summer, after the last expected frosts[K]. This is a hybrid species, it will not breed true from seed. Cuttings of half-ripe terminal shoots, 5 - 8cm long, July/August in a shaded frame. Should root by late September but leave them in the frame over winter and plant out in late spring[78]. High percentage[11]. Cuttings of ripe terminal shoots, taken in winter after a hard frost, in a shaded frame[113].

nwatta Landscape Uses:Border, Hedge, Massing, Screen, Superior hedge. Thrives in almost any soil, acid or alkaline, as long as it is well-drained[200]. Succeeds in dry soils. Plants are very shade tolerant[82]. Dormant plants are very cold-hardy in Britain, though the new growth in spring can be damaged by light frosts[K]. Leaves have a reddish tinge when the plants are grown in a sunny position[200]. Plants produce very little fibrous root and should be planted in their final positions when still small[200]. Plants in this genus are notably resistant to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required. The cultivar 'Sargentii' was 3 metres tall and 1 metre wide at the Hillier Arboretum in September 1993. It was growing well and carrying a good crop of tasty fruit though the harvest time seemed to be somewhat later than that of *T. baccata*[K]. Special Features: Not North American native, Inconspicuous flowers or blooms.

5.2.272 Cardamine pennsylvanica

Bittercress

4 tlin 8 cyuc 2 kcaok 0 tcan 1 dwat 0.6 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta Cardamine pennsylvanica is a BIENNIAL/PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to August, and the seeds ripen from May to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: LeavesEdible Uses: CondimentLeaves - raw or cooked[46, 61, 159, 171]. An excellent water cress substitute[105]. A slightly bitter flavour, but not disagreeable[207]. The grated raw root is used as a condiment[207].

dwatta Carminative DigestiveThe leaves and the flowering plants are carminative and digestive[172].

nrakta N. America - Newfoundland to Minnesota and Montana, south to Florida, Tennessee and Kansas. ksacta Usually found in moist or wet soils[159], it grows in most soils and habitats in eastern N. America[43].

propta Seed - sow outdoors in a seedbed in a shady position in April. Plant out in autumn or spring. Division.

nwatta We have very little information on this species and do not know if it will be hardy in Britain, though judging by its native range it should succeed outdoors in most parts of this country. A polymorphic species[43], it is closely related to *C. parviflora*[274]. The following notes are based on the general needs of the genus. Prefers a moist humus rich soil in shade or semi-shade[200] but succeeds in most soils that are not dry[1].

5.2.273 Ulmus macrocarpa

4 tlin 8 cyuc 2 kcaok 0 tcan 1 dwat m hkuc hmimhtut cyutli kyucxup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli ixre7t hjonli

drutta Ulmus macrocarpa is a deciduous Tree growing to 10 m (32ft 10in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to May, and the seeds ripen from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: Leaves - raw or cooked. The fruits are eaten in sauces. An emergency food, they are only used when all else fails[177].

tcanta Parasiticide Parasiticide WoodUsed externally on body parasites[178]. No more details.

dwatta Anthelmintic Antidote Astringent Digestive Parasiticide Parasiticide SkinThe seed is anthelmintic, antidote, digestive, febrifuge, parasiticide, skin[178, 218]. The bark contains tannins. It is astringent and has antimicrobial activities[279]. It is used in the treatment of chronic diarrhoea and internal parasites[279].

nrakta E. Asia - China, Japan. ksacta Sunny dry rocky mountain slopes in W. China[109]. Mixed forests, slopes, valleys at elevations of 700 - 800 metres[266].

propta Seed - if sown in a cold frame as soon as it is ripe, it usually germinates within a few days[200]. Stored seed does not germinate so well and should be sown in early spring[200]. The seed can also be harvested 'green' (when it has fully developed but before it dries on the tree) and sown immediately in a cold frame. It should germinate very quickly and will produce a larger plant by the end of the growing season[80]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Plants should not be allowed to grow for more than two years in a nursery bed since they form a tap root and will then move badly. Layering of suckers or coppiced shoots[200].

nwatta Prefers a fertile soil in full sun[188], but is easily grown in any soil of at least moderate quality so long as it is well drained[1]. This species is resistant to 'Dutch elm disease', a disease that has destroyed the greater part of all the elm trees growing in Britain. The disease is spread by means of beetles. There is no effective cure (1992) for the problem, but most E. Asian, though not Himalayan, species are resistant (though not immune) to the disease so the potential exists to use these resistant species to develop new resistant hybrids with the native species[200]. The various species of this genus hybridize freely with each other and pollen is easily saved, so even those species with different flowering times can be hybridized[200].

5.2.274 Malus hupehensis

Chinese Crab, Chinese crab apple, Tea Crabapple, Flowering Tea Crabapple

4 tlin 8 cyuc 2 kcaok 0 tcan 0 dwat 7 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta Malus hupehensis is a deciduous Tree growing to 7 m (23ft) by 7 m (23ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from April to May, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects, Apomictic (reproduce by seeds formed without sexual fusion). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

pcista All members of this genus contain the toxin hydrogen cyanide in their seeds and possibly also in their leaves, but not in their fruits. Hydrogen cyanide is the substance

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

kcakta Edible Parts: Fruit**Edible Uses:** TeaFruit - raw or cooked[105, 177]. Up to 1 cm in diameter[200], it has a sour taste[183]. The leaves are a tea substitute[11, 46, 105]. Palatable and thirst quenching, it is much used in China and leaves are exported from Shasi for this purpose[183].

tcanta Rootstock ShelterbeltA vigorous branching tree, it makes a good windbreak[245]. This species is used as stock to graft apple trees in Hubei and Sichuan[266].

nrakta E. Asia - China, Japan. ksacta Mixed forests, slopes and valley thickets from sea level to 2900 metres[266].

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

nwatta Landscape Uses:Border, Espalier, Standard, Specimen. An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade, though it fruits less well in such a situation[200]. Plants usually produce seed apomictically (a method that does not involve sexual fusion, so the seedlings are clones of the parent) and therefore they breed true to type[11, 200]. A very ornamental plant[1]. The flowers are sweetly scented[245]. The fruit is a good wildlife food source, especially for birds. Plants in this genus are notably susceptible to honey fungus[200]. **Special Features:** Not North American native, Fragrant flowers, Attractive flowers or blooms.

5.2.275 Amelanchier parviflora

4 tlin 8 cyuc 2 kcaak 0 tcan 0 dwat 2 m hkuc htut cyutli tcup hwicli hrasjlutnyikfripr hpa7tli flatpriklwis hpa7tmwatli fyfxre7t hjonli

drutta Amelanchier parviflora is a deciduous Shrub growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Fruit**Edible Uses:** Edible fruit - raw or cooked. The fruit is rich in iron and copper[226].

tcanta Wood - fine grained, hard, very heavy, reddish. Used for small articles[74].

nrakta W. Asia - Turkey. ksacta Not known

propta Seed - it is best harvested 'green', when the seed is fully formed but before the seed coat has hardened, and then sown immediately in pots outdoors or in a cold frame. If stored seed is obtained early enough in the autumn, it can be given 4 weeks warm stratification before being left out in the winter and it should then germinate in the spring. Otherwise seed can be very slow to germinate, perhaps taking 18 months or more. When large enough to handle, prick the seedlings out into individual pots and grow them on in a sheltered outdoor position, planting them out once they are 20cm or more tall. If there is sufficient seed it is best to sow it thinly in an outdoor seedbed[78, 80]. Grow the seedlings on for two years in the seedbed before planting them out into their permanent positions during the winter. Layering in spring - takes 18 months[78]. Division of suckers in late winter. The

suckers need to have been growing for 2 years before you dig them up, otherwise they will not have formed roots. They can be planted out straight into their permanent positions if required.

nwatta Prefers a rich loamy soil in a sunny position or semi-shade[1, 200] but thrives in any soil that is not too dry or water-logged[11]. Grows well in heavy clay soils. Fairly lime tolerant[200]. Plants are hardy to about -20°C[184]. All members of this genus have edible fruits and, whilst this is dry and uninteresting in some species, in many others it is sweet and juicy. Many of the species have potential for use in the garden as edible ornamentals. The main draw-back to this genus is that birds adore the fruit and will often completely strip a tree before it is fully ripe[K]. A group of young plants about 5 years old growing at Kew under this name were about 2 metres tall with almost no side-branches in 1995 and flowering at the end of April. They look as though their final height will be substantially more than that given above[K]. This species is closely related to *A. ovalis*[11]. Hybridizes freely with other members of this genus[200]. Grafting onto seedlings of *A. lamarkii* or *Sorbus aucuparia* is sometimes practised in order to avoid the potential problem of hybridizing[1].

5.2.276 Symphytum tuberosum

Tuberous comfrey

4 tlin 8 cyuc 2 kcaak 0 tcan 0 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfripr hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Symphytum tuberosum is a PERENNIAL growing to 0.6 m (2ft) by 0.6 m (2ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to June, and the seeds ripen from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista No reports of toxicity have been seen for this species, but the following reports have been seen for *S. officinale*. This plant contains small quantities of a toxic alkaloid which can have a cumulative effect upon the liver. Largest concentrations are found in the roots, leaves contain higher quantities of the alkaloid as they grow older and young leaves contain almost none. Most people would have to consume very large quantities of the plant in order to do any harm, though anyone with liver problems should obviously be more cautious. In general, the health-promoting properties of the plant probably far outweigh any possible disbenefits, especially if only the younger leaves are used.

kcakta Edible Parts: Edible **Uses:** CoffeeWhen roasted until brown and brittle, and then finely ground, the root is used as a coffee substitute. It has a smoothness that is not found in real coffee[183].

tcanta A good, and sometimes rampant, ground cover plant for a shady border or woodland.

nrakta Europe, including Britain, south and east from Germany to Spain, S.w.Russia and Turkey. ksacta Woods, scrub and by rivers[187].

propta Seed - sow spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. If you have sufficient seed you can try an outdoor sowing in situ in the spring. Division succeeds at almost any time of the year. Simply use a spade to chop off the top 7cm of root just below the soil level. The original root will regrow and you will have a number of root tops, each of which will make a new plant. These can either be potted up or planted out straight into their permanent positions.

nwatta Tolerates moist soils and situations but prefers a moist soil and some shade. Grows well in heavy clay soils. Hardy to about -20°C[187]. Plants form extensive patches, spreading by means of a creeping tuberous rhizome[187]. Plants are dormant in summer[187].

5.2.277 Pyrus elaeagnifolia

4 tlin 8 cyuc 2 kcaak 0 tcan 0 dwat 10 m hkuc hmimhtut cyutli hgtakytucup hwicli hrasjlutnyikfripr hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Pyrus elaeagnifolia is a deciduous Tree growing to 10 m (32ft) by 10 m (32ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in April. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. It can tolerate atmospheric pollution.

kcakta Edible Parts: Fruit**Edible Uses:** Fruit - raw or cooked[105, 177]. The flesh is rather tough and gritty, but has a reasonable flavour when it is fully ripe[K]. The fruits are up to 2cm long[200].

nrakta S.E. Europe to W. Asia. ksacta Dry places in S. Europe[50]. Deciduous and coniferous forests, forest remnants etc, from sea level to 1700 metres in Turkey[93].

propta Seed - best sown in a cold frame as soon as it is ripe in the autumn, it will then usually germinate in mid to late winter. Stored seed requires 8 - 10 weeks cold stratification at 1°C and should be sown as early in the year as possible[200]. Temperatures over 15 - 20°C induce a secondary dormancy in the seed[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for their first year. Plant them out in late spring or early summer of the following year.

nwatta Prefers a good well-drained loam in full sun[200]. Grows well in heavy clay soils. Tolerates light shade but does not fruit so well in such a position. Tolerates atmospheric pollution, excessive moisture and a range of soil types if they are moderately fertile[200]. Established plants are drought tolerant[200]. Plants are hardy to at least -15°C[200]. The branches are thorny[200]. This species is closely related to *P. nivalis*[11].

5.2.278 Prunus pedunculata

4 tlin 8 cyuc 2 kcaak 0 tcan 1 dwat 2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Prunus pedunculata is a deciduous Shrub growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from May to June, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: Fruit **SeedEdible Uses:** Fruit - raw or cooked[177]. The fruit is about 10mm in diameter and contains one large seed[200]. Seed - raw or cooked. Do not eat the seed if it is too bitter - see the notes above on toxicity.

tcanta DyeA green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168].

dwatta Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta E. Asia - northern China, Mongolia and Siberia. ksacta Stony mountain slopes and watersheds with steppe vegetation[74]. Sunny pebbly slopes and steppes in Nei Mongol, Ningxia and Shaanxi Provinces of China[266].

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200]. Softwood cuttings from strongly growing plants in spring to early summer in a frame[200]. Layering in spring.

nwatta Industrial Crop: Oil **Management:** Standard Wild CropThrives in a well-drained moisture-retentive loamy soil[11, 200]. Prefers some lime in the soil but is likely to become chlorotic if too much lime is present[1]. Succeeds in sun or partial shade though it fruits better in a sunny position[11, 200]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. Plants in this genus are notably susceptible to honey fungus[200].

5.2.279 Corylus x vilmorinii

Chinese Trazel

4 tlin 8 cyuc 2 kcaak 0 tcan 0 dwat 25 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Corylus x vilmorinii is a deciduous Tree growing to 25 m (82ft 0in). See above for USDA hardiness. It is hardy to UK zone 5. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

kcakta Edible Parts: Oil **SeedEdible Uses:** OilSeed - raw or cooked[177]. Rich in oil. The seed ripens in mid to late autumn and will probably need to be protected from squirrels[K]. When kept in a cool place, and not shelled, the seed should store for at least 12 months[K]. An edible oil is obtained from the seed.

nrakta A hybrid, C. chinensis x C. avellana. ksacta Not known in the wild.

propta Seed - best sown as soon as it is harvested in autumn in a cold frame[164]. Germinates in late winter or spring. Stored seed should be pre-soaked in warm water for 48 hours and then given 2 weeks warm followed by 3 - 4 months cold stratification[164]. Germinates in 1 - 6 months at 20°C[164]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame or sheltered place outdoors for their first winter. Plant them out into their permanent positions in late spring or early summer[K]. This species is a hybrid and will not breed true from seed. Layering in autumn. Easy, it takes about 6 months[78, 200].

nwatta An easily grown plant, it succeeds in most soils, but is in general more productive of seeds when grown on soils of moderate fertility[11, 200]. It does less well in rich heavy soils or poor ones[11, 63]. Does well in a loamy soil[11]. Very suitable for an alkaline soil[11], but it dislikes very acid soils[17]. Plants are fairly wild tolerant[1, 11]. Members of this genus bear transplanting well and can be easily moved even when relatively large[11]. This species is an artificial hybrid, produced by crossing *C. chinensis* x *C. avellana*. The Chinese parent contributes a characteristic rounded nut with a slightly thinner shell than *C. columa*.

5.2.280 Papaver rhoeas

Corn Poppy, Field Poppy, Shirley Poppy

4 tlin 8 cyuc 2 kcaak 0 tcan 3 dwat 0.6 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyfxre7t hjonli

undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. This species is closely related to *C. sanguinea*[200].

5.2.391 *Polygonatum odoratum thunbergii*

4 tin 8 cyuc 2 kcaak 0 tcan 0 dwat 0.5 m hkuc
pcimhmnt cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyfjxre7t hjonli

drutta *Polygonatum odoratum thunbergii* is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in April. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

pcista Although no reports of toxicity have been seen for this species, some members of this genus are believed to have poisonous fruits and seeds.

kcakta Edible Parts: Leaves RootEdible Uses: Young shoots - raw or cooked[105]. They can be used as an asparagus substitute. Root - raw or cooked[2, 105]. Rich in starch. nrakta E. Asia - Japan. ksacta Wet grassy places in lowland areas all over Japan[58].

propta Seed - best sown as soon as it is ripe in early autumn in a shady part of a cold greenhouse[200]. Sow stored seed as early in the year as possible. Germination can be slow, they may not come true to type[200] and it takes a few years for them to reach a good size. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a shady position in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in March or October. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Prefers a fertile humus rich moisture-retentive well-drained soil in cool shade or semi-shade[200]. Plants are intolerant of heat and drought but they tolerate most other conditions[200]. Naturalizes well in woodlands and copses[1]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. The young shoots of most members of this genus are very attractive to slugs[K]. Hybridizes with other members of this genus[200].

5.2.392 *Rosa x damascena*

Damask Rose
4 tin 8 cyuc 2 kcaak 0 tcan 1 dwat 1.5 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyfjxre7t hjonli

drutta *Rosa x damascena* is a deciduous Shrub growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from June to July. The species is

hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista There is a layer of hairs around the seeds just beneath the flesh of the fruit. These hairs can cause irritation to the mouth and digestive tract if ingested.

kcakta Edible Parts: Flowers Fruit Seed StemEdible Uses: CondimentYoung shoots - raw or cooked[105, 177]. Best used when they are still red-coloured, they are peeled before being eaten[183]. Petals - cooked. They are the source of 'attar of roses' and 'rose water', and are used as a flavouring for drinks, sweets, baked goods, ice cream etc[183]. The petals are also used to make jam[74]. Fruit - raw or cooked. The fruit is about 25mm in diameter[200], but there is only a thin layer of flesh surrounding the many seeds[K]. Some care has to be taken when eating this fruit, see the notes above on known hazards. The leaves are used as a seasoning. The seed is a good source of vitamin E, it can be ground into a powder and mixed with flour or added to other foods as a supplement[102, 183]. Be sure to remove the seed hairs[102].

tcanta EssentialAn essential oil obtained from the flowers is much used for perfumery and as a flavouring[1, 46, 57, 171]. 1000g yields 0.5g of oil[61].

dwatta Aperient Astringent Cancer Cardiac TonicThe petals are applied externally as an astringent[240]. They are also made into a preserve and used as a tonic that helps to put on weight[240]. The buds (the report does not say if it is leaf or flower buds) are aperient, astringent, cardiac and tonic[240]. They are used for removing bile and cold humours[240]. The fruit of many members of this genus is a very rich source of vitamins and minerals, especially in vitamins A, C and E, flavanoids and other bio-active compounds. It is also a fairly good source of essential fatty acids, which is fairly unusual for a fruit. It is being investigated as a food that is capable of reducing the incidence of cancer and also as a means of halting or reversing the growth of cancers[214].

nrakta W. Asia. ksacta Not known in a truly wild situation, this species is probably a hybrid involving *R. centrifolia*[11, 74].

propta Seed. Rose seed often takes two years to germinate. This is because it may need a warm spell of weather after a cold spell in order to mature the embryo and reduce the seedcoat[80]. One possible way to reduce this time is to scarify the seed and then place it for 2 - 3 weeks in damp peat at a temperature of 27 - 32°C (by which time the seed should have imbibed). It is then kept at 3°C for the next 4 months by which time it should be starting to germinate[80]. Alternatively, it is possible that seed harvested 'green' (when it is fully developed but before it has dried on the plant) and sown immediately will germinate in the late winter. This method has not as yet(1988) been fully tested[80]. Seed sown as soon as it is ripe in a cold frame sometimes germinates in spring though it may take 18 months. Stored seed can be sown as early in the year as possible and stratified for 6 weeks at 5°C[200]. It may take 2 years to germinate[200]. Prick out the seedlings into individual pots when they are large enough to handle. Plant out in the summer if the plants are more than 25cm tall, otherwise grow on in a cold frame for the winter and plant out in late spring. Cuttings of half-ripe wood with a heel, July in a shaded frame. Overwinter the plants in the frame and plant out in late spring[78]. High percentage[78]. Cuttings of mature wood of the current seasons growth. Select pencil thick shoots in early autumn that are about 20 - 25cm long and plant them in a sheltered position outdoors or in a cold frame[78, 200]. The cuttings can take 12 months to establish but a high percentage of them normally succeed[78]. Division of suckers in the dormant season. Plant them out direct into their permanent positions. Layering. Takes 12 months[11].

nwatta Succeeds in most soils[11], preferring a circum-neutral soil and a sunny position[200]. Grows well in heavy clay soils. Dislikes water-logged soils[200]. The plant resists frost[74]. A very ornamental plant[1], the flowers are very fragrant[245]. This species is commonly cultivated for its essential oil[57]. It is a parent of many varieties of perpetual-flowering garden roses[1]. Grows well with alliums, parsley, mignonette and lupins[18, 20]. Garlic planted nearby can

and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177]. About 15mm in diameter[200]. The fruit is abundantly produced and hangs on the tree well into winter[200]. The flavour improves when the fruit has been frosted, so it is best to delay harvesting as long as possible[K]. nrakta E. Asia - China. ksacta Thickets on slopes at elevations of 2000 - 3000 metres[266]. Up to 3600 metres in Szechwan[109].

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

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[200]. A very ornamental plant[1], the fruit is a good wildlife food source, especially for birds[200]. This species is closely related to *M. transitoria*[200]. It hybridizes freely with other members of the genus[200]. Plants in this genus are notably susceptible to honey fungus[200].

5.2.315 *Anchusa officinalis*

Alkanet, Common bugloss
4 tin 8 cyuc 2 kcaak 1 tcan 1 dwat 0.6 m hkuc
htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Anchusa officinalis* is a BIENNIAL/PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to October, and the seeds ripen from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Flowers LeavesEdible Uses: ColouringLeaves and young shoots - cooked[9, 115, 166]. Used like spinach[2, 183]. Flowers - cooked or used as a garnish[183]. The red dye obtained from the roots can be used to colour oils and fats[105].

tcanta DyeA red dye is obtained from the roots[13]. dwatta Demulcent Expectorant HomeopathyAll parts of the plant are demulcent and expectorant[9]. They are used externally to treat cuts, bruises and phlebitis and internally to treat coughs and bronchial catarrh[9]. A homeopathic remedy is made from the plant[9]. It is used in the treatment of stomach and duodenal ulcers[9].

nrakta Europe to W. Asia. An introduced casual in Britain[17]. ksacta Roadsides, pastures and waste ground, preferring warmer areas[9, 13].

propta Seed - sow spring in pots of sandy soil[200]. An overnight drop in temperature helps germination[133]. The

seed usually germinates in 1 - 4 weeks at 21°C[133]. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. The seed can also be sown in an outdoor seed bed during July, transplanting the plants to their final positions during early autumn[245]. These plants will grow larger and flower earlier than those sown in spring.

nwatta Succeeds in most soils, preferring a sunny position[1]. Prefers a fertile well-drained soil[111]. The flowers are a rich source of nectar and are very attractive to bees[1]. The dry leaves emit a rich musky fragrance, rather like wild strawberry leaves drying.

5.2.316 *Pyrus betulaefolia*

Birch-Leaved Pear
4 tin 8 cyuc 2 kcaak 0 tcan 1 dwat 7.5 m hkuc
hmimhtut cyutli hgattcup hwicli hrasjlutnyikrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Pyrus betulaefolia* is a deciduous Tree growing to 7.5 m (24ft 7in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in April. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. It can tolerate atmospheric pollution.

kcakta Edible Parts: Flowers Fruit LeavesEdible Uses: TeaFruit - raw or cooked[2, 105, 177, 179, 183]. The fruit is quite small, about 15mm in diameter[200]. Leaves - cooked[179, 183]. Flowers[2, 183]. Dried, powdered and made into cakes[179]. The dried leaves are used to make tea[179].

tcanta Miscellany RootstockThis species has long been used as a rootstock for the cultivated pears by the Chinese[11], it is recently also being used as a rootstock in N. America and in Europe[183, 200].

dwatta Cholera MiscellanyThe leaves are used in the treatment of cholera, colic and cramps[218]. The cooked fruit is used to treat mucous diarrhoea[218].

nrakta E. Asia - N. China. ksacta Open slopes and plains from sea level to 1800 metres[266].

propta Seed - best sown in a cold frame as soon as it is ripe in the autumn, it will then usually germinate in mid to late winter. Stored seed requires 8 - 10 weeks cold stratification at 1°C and should be sown as early in the year as possible[200]. Temperatures over 15 - 20°C induce a secondary dormancy in the seed[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for their first year. Plant them out in late spring or early summer of the following year.

nwatta Prefers a good well-drained loam in full sun[200]. Grows well in heavy clay soils. Tolerates light shade but does not fruit so well in such a position. Tolerates atmospheric pollution, excessive moisture and a range of soil types if they are moderately fertile[200]. Established plants are drought tolerant[200]. Plants are hardy to at least -15°C[200]. A fast growing tree[11].

5.2.317 *Quercus serrata*

Bao li
4 tin 8 cyuc 2 kcaak 0 tcan 2 dwat 15 m hkuc
hmimhtut cyutli tcup hwicli jlutnyik hpa7tli flatprikliwis hpa7tmwatli hjonli

drutta *Quercus serrata* is a deciduous Tree growing to 15 m (49ft 3in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to May, and the seeds ripen from October to November. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

kcakta Edible Parts: Leaves SeedEdible Uses: CoffeeSeed - cooked. Highly nutritious[179]. The seed is about 15mm long[200], it can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed contains bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost[179]. Either the whole seed can be used or the seed can be dried and ground into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. Leaves - cooked. A famine food when all else fails[179]. The roasted seed is a coffee substitute.

tcanta Repellent Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. Wood - very hard, strong, red-brown in colour. Used for farm implements etc[61, 146].

dwatta Astringent DysenteryAny galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta E. Asia - China, Japan, Korea, Himalayas. ksacta Deciduous forests below 100 - 2000 metres[266].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. Prefers warmer summers than are usually experienced in Britain, trees often grow poorly in this country and fail to properly ripen their wood resulting in frost damage overwinter[200]. Trees are often coppiced in China[109]. The seed ripens in its first year[200]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200].

5.2.318 *Daucus carota*

Wild Carrot, Queen anne's lace, Carrot, Wild Carrot, Queen Anne's Lace

4 tlin 8 cyuc 2 kcaak 4 tcan 3 dwat 0.6 m hkuc htuc cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyfxre7t hjonli

drutta *Daucus carota* is a BIENNIAL growing to 0.6 m (2ft) by 0.3 m (1ft in) at a medium rate. See above for USDA hardness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies, beetles. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerate maritime exposure.

pcista Carrots sometimes cause allergic reactions in some people[46]. Skin contact with the sap is said to cause photo-sensitivity and/or dermatitis in some people[218]. *Daucus* has been reported to contain acetone, asarone, choline, ethanol, formic acid, HCN, isobutyric acid, limonene, malic acid, maltose, oxalic acid, palmitic acid,

pyrrolidine, and quinic acid. Reviewing research on myristicin, which occurs in nutmeg, mace, black pepper, carrot seed, celery seed, and parsley, Buchanan (J. Food Safety 1: 275, 1979) noted that the psychoactive and hallucinogenic properties of mace, nutmeg, and purified myristicin have been studied. It has been hypothesized that myristicin and elemicin can be readily modified in the body to amphetamines. Handling carrot foliage, especially wet foliage, can cause irritation and vesication. Sensitized photosensitive persons may get an exact reproduction of the leaf on the skin by placing the leaf on the skin for awhile, followed by exposure to sunshine[269].

kcakta Edible Parts: Flowers RootEdible Uses: Coffee CondimentRoot - cooked[55]. Thin and stringy[K]. The flower clusters can be french-fried to produce a carrot-flavoured gourmet's delight[183]. The aromatic seed is used as a flavouring in stews etc[55, 183]. The dried roasted roots are ground into a powder and are used for making coffee[183].

tcanta Cosmetic EssentialAn essential oil obtained from the seed has an orris-like scent[238]. It is used in perfumery and as a food flavouring[46, 238]. The oil has also been used cosmetically in anti-wrinkle creams[238].

dwatta Anthelmintic Carminative Contraceptive Deobstruent Diuretic Emmenagogue Galactagogue Ophthalmic Stimulant UrinaryThe wild carrot is an aromatic herb that acts as a diuretic, soothes the digestive tract and stimulates the uterus[238]. A wonderfully cleansing medicine, it supports the liver, stimulates the flow of urine and the removal of waste by the kidneys[254]. The whole plant is anthelmintic, carminative, deobstruent, diuretic, galactagogue, ophthalmic, stimulant[4, 7, 9, 13, 21, 165]. An infusion is used in the treatment of various complaints including digestive disorders, kidney and bladder diseases and in the treatment of dropsy[4, 238]. An infusion of the leaves has been used to counter cystitis and kidney stone formation, and to diminish stones that have already formed[254]. Carrot leaves contain significant amounts of porphyrins, which stimulate the pituitary gland and lead to the release of increased levels of sex hormones[254]. The plant is harvested in July and dried for later use. A warm water infusion of the flowers has been used in the treatment of diabetes[213]. The grated raw root, especially of the cultivated forms, is used as a remedy for threadworms[213, 222, 254]. The root is also used to encourage delayed menstruation[213]. The root of the wild plant can induce uterine contractions and so should not be used by pregnant women[213]. A tea made from the roots is diuretic and has been used in the treatment of urinary stones[222]. The seeds are diuretic[213, 218], carminative, emmenagogue and anthelmintic[4, 218]. An infusion is used in the treatment of oedema, flatulent indigestion and menstrual problems[238]. The seed is a traditional 'morning after' contraceptive and there is some evidence to uphold this belief. It requires further investigation[222]. Carrot seeds can be abortifacient and so should not be used by pregnant women[254].

nrakta Europe, including Britain, from Scandinavia south and east to N. Africa, China and eastern India. ksacta Cultivated and waste land, amongst grass, especially by the sea and on chalk[4, 17].

propta Seed - sow August/September or April in situ. The seed germinates better if it is given a period of cold stratification.

nwatta Landscape Uses:Border, Seashore. Prefers a sunny position and a well-drained neutral to alkaline soil[24, 238]. A good plant for the summer meadow[24], it is a food plant for caterpillars of the Swallow-tail Butterfly[200]. This species is the parent of the cultivated carrot[200]. It can act as an alternative host for pests and diseases of the cultivated carrots. The plant has become a pest weed in N. America, where it is spreading rapidly and crowding out native vegetation[274]. The whole plant, when bruised, gives off an aniseed-like scent[245]. Special Features: Edible, Not North American native, Naturalizing, Attracts butterflies, Suitable for cut flowers. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fleshy. Thick or swollen - fibrous or tap root [2-1].

one bud at the top of the section. In this case a thin, narrow strip of the bark about 3cm long is removed from the bottom half of the side of the stem. This will encourage callusing and the formation of roots. Due to the size of these cuttings they need to be kept in a more protected environment than the longer cuttings. Layering.

nwatta Prefers a deep rich moist well-drained moderately fertile loam[1, 200]. Grows best in a calcareous soil[200]. Succeeds in sun or partial shade though a warm sunny position is required for the fruit to ripen[200]. Plants climb by means of tendrils[182]. Any pruning should be carried out in winter when the plants are dormant otherwise they bleed profusely[182, 200]. Plants in this genus are notably susceptible to honey fungus[200].

5.2.389 *Platycodon grandiflorus*

Balloon Flower

4 tlin 9 cyuc 2 kcaak 0 tcan 3 dwat 0.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Platycodon grandiflorus* is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.4 m (1ft 4in) at a medium rate. See above for USDA hardness. It is hardy to UK zone 4 and is not frost tender. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The root is poisonous[116]. The older, basal leaves are also said to be slightly toxic[179]. If these reports are true then this is an exceptional species in a family that is generally free of toxins and often used for food[K].

kcakta Edible Parts: Leaves RootEdible Uses: CondimentYoung leaves - cooked[177]. The radical leaves are said to be slightly toxic so only the top leaves should be used. Old leaves are powdered and used as a flavouring. Root - cooked[177]. Eaten in soups as a tonic vegetable[238]. It is also peeled and pickled or preserved in sugar[218]. A nutritional analysis is available[218].

dwatta Anthelmintic Anticholesterolemic Antiphlogistic Antitussive Astringent Expectorant Haemolytic Hypoglycaemic Sedative Stomachic TonicThis species has a history of herbal use in China going back over 2,000 years and modern clinical tests have demonstrated its efficacy[218, 238]. It is widely used there in patent remedies and is also made into cough tablets[238]. The root contains saponins and is anthelmintic, antiasthmatic, anticholesterolemic, antiphlogistic, antitussive, astringent, carminative, expectorant, haemolytic, hypoglycaemic, sedative, stomachic, tonic and vermifuge. It lowers blood sugar and cholesterol levels in the liver and inhibits the release of histamine[116, 147, 174, 176, 178, 218, 238, 279]. It is used internally in the treatment of coughs with profuse phlegm, colds, bronchitis, pleurisy, pulmonary abscesses and throat infections[176, 238]. It is also used to treat hypertension and diabetes in Korea[279]. The root of plants 2 - 3 years old are harvested in the spring or autumn, peeled and used fresh or dried[238].

nrakta E. Asia - China, Japan, Korea, Manchuria, ksacta Grassy slopes in hills and mountains all over Japan[58].

propta Seed - sow spring in a cold frame[111]. Free and quick germination[K]. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the winter when the plants are dormant[238, K]. Basal cuttings of non-flowering shoots in spring, preferably with a piece of root attached[188]. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Landscape Uses:Border, Container, Rock garden, Specimen. An easily grown plant, it succeeds in any good well-drained garden soil but prefers a light more or less sandy soil in a sunny position or light dappled shade[200]. Plants are hardy to about -15°C[200]. Another report says it is hardy to -20°C[187]. A very ornamental and long-lived plant[1, 233], there are several named forms[238]. It is cultivated, especially in China, as a medicinal plant[61, 238].

This species has brittle roots and strongly resents root disturbance. It should be planted out in its permanent position as soon as possible, and preferably when dormant in the winter[111, 238]. Special Features: Suitable for cut flowers. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

5.2.390 *Crataegus maximowiczii*

4 tlin 8 cyuc 2 kcaak 0 tcan 2 dwat m hkuc hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Crataegus maximowiczii* is a deciduous Tree growing to 7 m (23ft). See above for USDA hardness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[177]. The fruit can be used in making pies, preserves, etc, and can also be dried for later use. It is about 1cm in diameter[200]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta E. Asia - Siberia to N. Japan. ksacta Riverain deciduous forest strips, crests, meadows of flooded valleys, forest edges and dry mountain slopes[74].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but

5.2.386 Cardamine bulbifera

Coral Root, Coralroot bittercress

4 tlin 8 cyuc 2 kcaak 0 tcan 0 dwat 0.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikli-wisslip hpa7tmwatli fyifxre7t hjonli

drutta Cardamine bulbifera is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from April to June, and the seeds ripen from May to July. The species is hermaphrodite (has both male and female organs) and is pollinated by insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves RootEdible Uses: Leaves - raw or cooked[K]. A hot cress-like flavour. Bulbils - raw or cooked. They are rather small, about the size of a lentil, but have a pleasant mild cress-like flavour[K]. Root - raw or cooked[K]. A hot flavour, it is pleasant but rather small[K].

nrakta Central Europe from Britain and France to Sweden, east to the Balkans, W. Asia and the Caucasus. ksacta Very local in woods, usually on calcareous soils, in Devon, S.E. England, the Chilterns and Ayr[17]. A characteristic species of base-rich beech woodlands[17].

propta Seed - best sown when ripe, otherwise sow it in the spring. If you have sufficient seed it can be sown in situ, otherwise it is best to sow it in pots in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle and pant out in the summer. The bulbils can be collected in early summer and potted up. Keep them in a cold frame over the winter and plant out when in active growth in the spring.

nwatta Prefers a moist humus rich soil in shade or semi-shade[200]. The flowers are rarely visited by pollinating insects and seed is rarely set, propagation is carried out by means of bulbils formed on the axils of the upper leaf stems[17, K].

5.2.387 Quercus ellipsoidalis

Northern Pin Oak

4 tlin 6 cyuc 2 kcaak 0 tcan 2 dwat 20 m hkuc hmimhtut cyutli tcup hwicli jlutnyik hpa7tli flatprikliwis hpa7tmwatli hjonli

drutta Quercus ellipsoidalis is a deciduous Tree growing to 20 m (65ft) by 13 m (42ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: CoffeeSeed - cooked. It can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed, which is up to 2cm long[229], contains bitter tannins - these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute[161, 177, 257].

tcanta Repellent Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be

used as a dyestuff[4]. Wood - hard, heavy strong. It is cut occasionally for lumber; being used for flooring, furniture and interior finishes[229].

dwatta Astringent Dysentery EmmenagogueAny galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4]. A decoction of the inner bark has been used to treat suppressed menses caused by cold[257].

nrakta Northern Central N. America - west and north of the Great Lakes. ksacta Dry to moist siliceous to argillaceous woods[43]. Prairies and sandy hills in dry soils[82]. The best specimens are found in rich well-drained soils, especially those containing clay[229].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Landscape Uses:Specimen, Street tree. Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Lime tolerant[188]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. Prefers warmer summers than are usually experienced in Britain, trees often grow poorly in this country and fail to properly ripen their wood resulting in frost damage overwinter[200]. A moderately fast-growing tree in the wild[229]. Seed production is cyclic, with a year of high yields being followed by 2 - 3 years of low yields[229]. The tree flowers on new growth produced in spring, the seed taking two summers to ripen[229]. Hybridizes in the wild with *Q. velutina*[43]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200]. Special Features:North American native, Inconspicuous flowers or blooms.

5.2.388 Vitis palmata

Red Grape, Catbird grape

4 tlin 8 cyuc 2 kcaak 0 tcan 0 dwat 20 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Vitis palmata is a deciduous Climber growing to 20 m (65ft 7in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to July, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit - raw or dried for winter use[159, 177]. A sweet flavour when mature[274]. The fruit is up to 10mm in diameter and is carried in small bunches[235]. Young leaves are wrapped around other foods and then baked, they impart a pleasant flavour[159]. Young tendrils - raw or cooked. Used as a snack[159].

tcanta DyeA yellow dye is obtained from the fresh or dried leaves[168].

nrakta Southern and Central N. America - Illinois, Missouri and Arkansas. ksacta Sandy banks and rocky places[72]. Borders of sloughs and ponds[159].

propta Seed - best sown in a cold frame as soon as it is ripe[K]. Six weeks cold stratification improves the germination rate, and so stored seed is best sown in a cold frame as soon as it is obtained. Germination should take place in the first spring, but sometimes takes another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant out in early summer. Cuttings of mature wood of the current seasons growth, December/January in a frame. These cuttings can be of wood 15 - 30cm long or they can be of short sections of the stem about 5cm long with just

5.2.319 Rubus caesius

Dewberry, European dewberry

4 tlin 8 cyuc 2 kcaak 0 tcan 0 dwat 0.2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikli-wisslip hpa7tmwatli fyifxre7t hjonli

drutta Rubus caesius is a deciduous Shrub growing to 0.2 m (0ft 8in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to September, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles, Apomictic (reproduce by seeds formed without sexual fusion). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: TeaFruit - raw or cooked[1, 2, 3, 12, 183]. Succulent but not very tasty[74]. A delicious flavour; it is considered to be superior to blackcurrants though the fruit is rather small and consists of just a few drupes[2]. The fruit can be used for making jellies, preserves etc[183]. The fresh or dried leaves are used as a tea substitute[46, 61, 183].

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

nrakta Europe, including Britain, from Scandinavia south and east to Spain, Siberia and W. Asia. ksacta Hedgerows, amongst shrubs and in rough dry meadowland, usually on basic soils[1, 17].

propta Seed - requires stratification and is best sown in early autumn in a cold frame. Stored seed requires one month stratification at about 3°c and is best sown as early as possible in the year. Prick out the seedlings when they are large enough to handle and grow on in a cold frame. Plant them out into their permanent positions in late spring of the following year. Cuttings of half-ripe wood, July/August in a frame[200]. Tip layering in July. Plant out in autumn. Division in early spring or just before leaf-fall in the autumn[200].

nwatta Easily grown in a good well-drained loamy soil in sun or semi-shade[1, 11, 200]. Succeeds on chalky soils[200]. This species is a blackberry with biennial stems, it produces a number of new stems each year from the perennial rootstock, these stems fruit in their second year and then die[200]. Plants in this genus are notably susceptible to honey fungus[200].

5.2.320 Vitis coignetiae

Crimson Glory Vine

4 tlin 8 cyuc 2 kcaak 0 tcan 0 dwat 20 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Vitis coignetiae is a deciduous Climber growing to 20 m (65ft) by 20 m (65ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to July, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Fruit Leaves StemEdible Uses: Fruit - raw or dried for winter use[105, 177, 183]. The fruit is about 12mm in diameter and is carried in bunches, but it is scarcely edible[200]. Young leaves are wrapped around other foods and then baked, they impart a pleasant flavour. Young tendrils - raw or cooked. Young stems and leafstalks - boiled[105, 177, 183].

tcanta DyeA yellow dye is obtained from the fresh or dried leaves[168]. Plants can be used as a ground cover in a sunny position[188]. They are best spaced about 3.5 metres apart each way[208]. They can be encouraged to cover the ground by laying brushwood flat on the ground and pegged into position. The twigs would eventually rot and the plant would assume complete and constant control[208].

nrakta E. Asia - Japan, Korea. ksacta Grows into trees in forests[11].

propta Seed - best sown in a cold frame as soon as it is ripe[K]. Six weeks cold stratification improves the germination rate, and so stored seed is best sown in a cold frame as soon as it is obtained. Germination should take place in the first spring, but sometimes takes another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant out in early summer. Cuttings of mature wood of the current seasons growth, December/January in a frame. These cuttings can be of wood 15 - 30cm long or they can be of short sections of the stem about 5cm long with just one bud at the top of the section. In this case a thin, narrow strip of the bark about 3cm long is removed from the bottom half of the side of the stem. This will encourage callusing and the formation of roots. Due to the size of these cuttings they need to be kept in a more protected environment than the longer cuttings. Cuttings are difficult for this species[219]. Layering. This is the best method for this species[219].

nwatta Prefers a deep rich moist well-drained moderately fertile loam[1, 200]. Grows best in a calcareous soil[200]. Succeeds in sun or partial shade though a warm sunny position is required for the fruit to ripen[200]. The fully dormant plant is hardy to about -25°c, though the young growth in spring can be damaged by late frosts. Plants climb by means of tendrils[182]. Any pruning should be carried out in winter when the plants are dormant otherwise they bleed profusely[182, 200]. A fast growing climber[11, 202], attaching itself by means of tendrils[182], it is ideal for growing into large trees. Plants are often slow to establish, taking 1 - 2 years from planting out before they make much new growth[202]. A very ornamental plant[1] with its large leaves which colour well in the autumn. Plants in this genus are notably susceptible to honey fungus[200].

5.2.321 Cardamine flexuosa

Wavy Bittercress,Woodland bittercress

4 tlin 8 cyuc 2 kcaak 0 tcan 0 dwat 0.5 m hkuc hmimhtut cyutli tcupha7n hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta Cardamine flexuosa is a ANNUAL/PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from April to September, and the seeds ripen from May to September. The species is hermaphrodite (has both male and female organs). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: Leaves RootEdible Uses: Leaves - raw or cooked[8, 52, 105, 183]. A hot cress-like flavour. Nice as a flavouring in salads, it is usually available all year round. Root - raw or cooked[183].

nrakta Much of Europe, including Britain, east through Asia to China and Japan. ksacta Moist shady places by streams and occasionally on cultivated ground[17].

propta Seed - sow spring or autumn in situ. This species needs very little encouragement and is quite capable of sowing itself, often too freely.

nwatta Prefers a moist humus rich soil in shade or semi-shade[200] but it succeeds in most soils and positions[1]. A common garden weed, it is found especially in pot-grown plants[8].

5.2.322 Acer pseudoplatanus

Sycamore, Great Maple, Scottish Maple, Planetree Maple

4 tlin 7 cyuc 2 kcaak 4 tcan 1 dwat 30 m hkuc hmimhtut cyutli tcup hwicli hyishrasjlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli hjonli

drutta Acer pseudoplatanus is a deciduous Tree growing to 30 m (98ft) by 15 m (49ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to June, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils.

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

kcakta Edible Parts: Leaves Sap SeedpodEdible Uses: SweetenerThe sap contains sugar and can be used as a drink or be concentrated into a syrup by boiling off the water[183]. The syrup is used as a sweetener on many foods. It can be harvested in late winter but is not produced in economic quantities[2, 4, 13, 105]. About 25 grams of sugar is obtained from a litre of the sap[4]. The sap can also be used to make a wine[183]. The flow is best on warm sunny days following a frost. The best sap production comes from cold-winter areas with continental climates. The keys of the developing seeds have a sweet exudation on them and this is often sucked by children[183]. The leaves can be wrapped round food such as buns when baking them and they impart a sweet flavour[66]. The related Oregon Maple (*Acer macrophyllum*) has yellow flower clusters, sweet with nectar, eaten raw[183]. No information was found for this species.

tcanta Charcoal Fuel Pioneer Preservative Shelterbelt WoodThe trees are fast-growing and make a good windbreak for exposed and maritime areas[11, 200]. They are often used in shelterbelt plantings[200]. This species usually self-sows freely and is often the first tree to invade disused farmland, cleared woodland etc. Its ability to tolerate difficult environments make it a good pioneer species for re-establishing woodlands. When grown in Britain it is usually gradually displaced over a period of 200 years or more by native species until it becomes just a minor component of the woodland[K]. The leaves are packed around apples, rootcrops etc to help preserve them[18, 20]. Wood - very hard, heavy, elastic, easy to work, fairly resistant to insects. Used for carving, small domestic items, veneer etc[4, 13, 46, 171]. It is a good fuel and also makes a good charcoal that can be used as a fuel[115].

dwatta Astringent VulneraryThe bark has mild astringent properties and has been used to make a wash for skin problems and an eyewash for sore eyes[21]. The inner bark of the tree, containing the sweet sap, can be used as a dressing for wounds[21].

nrakta Europe. Extensively naturalized in Britain[17]. ksacta Found in woodland, hedgerows etc. in Britain, in all but very poor soils[17].

propta Seed - best sown as soon as it is ripe in a cold frame, it usually germinates in the following spring. Pre-soak stored seed for 24 hours and then stratify for 2 - 4 months at 1 - 8°C. It can be slow to germinate. Seed should not be dried below 35% moisture[98]. The seed can be harvested 'green' (when it has fully developed but before it has dried and produced any germination inhibitors) and sown immediately. It should germinate in late winter. If the seed is harvested too soon it will produce very weak plants or no plants at all[80, 113]. When large enough to handle, prick the seedlings out into individual pots and grow them on until they are 20cm or more tall before planting them out in their permanent positions. Layering, which takes about 12 months, is successful with most species in this genus. Cuttings of young shoots in June or July. The cuttings should have 2 - 3 pairs of leaves, plus one pair of buds at the base. Remove a very thin slice of bark at the base of the cutting, rooting is improved if a rooting hormone is used. The rooted cuttings must show new growth during the summer before being potted up otherwise they are unlikely to survive the winter. Cultivars can be budded onto rootstocks of the species. Any grafting is best carried out in September rather than February.

nwatta Landscape Uses:Firewood, Seashore, Specimen, Street tree. Of easy cultivation, it prefers a good moist well-drained soil and a sunny position[11, 17], but tolerates most conditions including poor soils and some shade[13, 17, 200]. Grows well in heavy clay soils. Chlorosis can sometimes develop as a result of iron deficiency when the plants are grown in alkaline soils, but in general maples are not fussy as to soil pH. Dislikes wet soils[115]. Grows better in the cooler areas of the country[11]. Very wind-resistant, tolerating maritime exposure though it is often wind and salt pruned in very exposed areas[4, 11, 17]. A fairly aggressive tree, it self-sows freely and inhibits the growth of nearby plants[18, 20]. It is often one of the first trees to colonize open land. It is fast growing and establishes rapidly. It can supplant native trees, at least in the short-term, though recent evidence suggests that in the long term it does not usually become the dominant tree in British woodlands and it is often recom-

mended for planting in broad-leaved woods by the Forestry Commission, especially in windy areas[K]. Plants are subject to sooty bark disease - this is not fatal and occurs most often in years that follow hot summers[11]. There are many named forms that have been selected for their ornamental value[200]. Trees take 25 years to come into bearing from seed[98]. Special Features:Not North American native, Naturalizing, Inconspicuous flowers or blooms. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

5.2.323 Quercus coccinea

Scarlet Oak

4 tin 8 cyuc 2 kcaak 0 tcan 2 dwat 25 m hkuc hmimhtut cyutli tcup hwicli jlutnyik hpa7tli flatprikliws hpa7tmwatli hjonli

drutta Quercus coccinea is a deciduous Tree growing to 25 m (82ft) by 15 m (49ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in May, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: CoffeeSeed - cooked. It can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed, which is up to 25mm long and 15mm wide[82, 229], contains bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute.

tcanta Repellent Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. Wood - strong, hard, heavy, coarse grained[46, 82, 171, 229]. It weighs 46lb per cubic foot[235]. Inferior to wood from the white oaks, it is used in construction, furniture etc[46, 82, 171, 229].

dwatta Astringent DysenteryAny galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta Eastern N. America - Maine and Ontario to Minnesota, North Carolina and Missouri. ksacta Found on upland sites such as ridges and middle and upper slope, it grows in a variety of soils doing well on poor, dry, sandy, or gravelly soils[229].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Landscape Uses:Aggressive surface roots possible, Street tree. Prefers a good deep fertile loam which

year and this can be maintained for the next 70 years or so. Growth virtually ceases by the time the tree is 90 - 100 years old[185]. Increases in girth follow the same pattern as height increases[185]. Trees probably do not live much longer than 100 years in Britain[185]. They are occasionally planted on a small scale in Europe as a timber tree[50]. Trees should be planted into their permanent positions when they are quite small, between 30 and 90cm. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200]. The bruised leaves have a resinous aroma[245]. Special Features: Not North American native, Inconspicuous flowers or blooms.

5.2.384 Cirsium arvense

Creeping Thistle, Canada thistle

4 tin 7 cyuc 2 kcaak 2 tcan 2 dwat 0.9 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliws hpa7tmwatli fyfjxre7t hjonli

drutta Cirsium arvense is a PERENNIAL growing to 0.9 m (3ft) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies), beetles. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Leaves Oil Root StemEdible Uses: Curdling agent OilRoot of first year plants - raw or cooked[183]. Nutritious but rather bland, they are best used in a mixture with other vegetables[9]. The root is likely to be rich in inulin, a starch that cannot be digested by humans. This starch thus passes straight through the digestive system and, in some people, ferments to produce flatulence[K]. Stems - they are peeled and cooked like asparagus or rhubarb[9, 12, 177, 183]. Leaves - raw or cooked[177, 183]. A fairly bland flavour, but the prickles need to be removed before the leaves can be eaten - not only is this rather fiddly but very little edible leaf remains[K]. The leaves are also used to coagulate plant milks etc[46, 61, 183].

tcanta Oil TinderThe seed fluff is used as a tinder[106]. The seed of all species of thistles yields a good oil by expression[4]. The seed of this species contains about 22% oil[240]. Dynamic accumulator.

dwatta Antiphlogistic Astringent Diuretic Emetic Emmenagogue Hepatic TonicThe root is tonic, diuretic, astringent, antiphlogistic and hepatic[207]. It has been chewed as a remedy for toothache[4]. A decoction of the roots has been used to treat worms in children[257]. A paste of the roots, combined with an equal quantity of the root paste of *Amaranthus spinosus*, is used in the treatment of indigestion[272]. The plant contains a volatile alkaloid and a glycoside called cinicin, which has emetic and emmenagogue properties[240]. The leaves are antiphlogistic[207]. They cause inflammation and have irritating properties[207].

nrakta Europe, including Britain, from Scandinavia south and east to N. Africa and Asia. ksacta Arable land, roadsides etc[9, 13], a common weed of cultivated land[17].

propta Seed - sow early spring or autumn in situ. Germination usually takes place within 2 - 8 weeks at 20°C. A pernicious weed, not many people would want to invite this plant into their garden.

nwatta The creeping thistle is a pernicious garden weed, spreading freely from its aggressive root system[17, K]. It can quickly form dense clumps of growth and really does not need to be introduced into the garden. Succeeds in any ordinary garden soil in a sunny position[200]. Plants are often dioecious[17]. A polymorphic species[17]. Special Features:North American native, Invasive, Attracts butterflies. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fleshy. Thick or swollen - fibrous or tap root [2-1].

5.2.385 Oplonanax horridus

Devil's Club

4 tin 8 cyuc 2 kcaak 0 tcan 2 dwat 2 m hkuc pcmhmm cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliws hpa7tmwatli xre7t hjonli

drutta Oplonanax horridus is a deciduous Shrub growing to 2 m (6ft) by 2 m (6ft). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from June to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil. The plant can tolerate maritime exposure.

pcista The plant is densely armed with spikes and these spikes are irritant[200].

kcakta Edible Parts: Leaves RootEdible Uses: Young shoots - peeled and then cooked[46, 61, 105, 106]. Only the very young shoots are used[172]. The roots can be chewed after peeling[105, 106, 161].

tcanta Parasiticide ParasiticideThe berries can be mashed into a pulp and then rubbed onto the scalp to get rid of head lice[257].

dwatta Analgesic Antidandruff Antiphlogistic Antirheumatic Hypoglycaemic Parasiticide Parasiticide TonicDevil's club was widely employed medicinally by several native North American Indian tribes who used it especially for its pain-relieving properties[257]. It is little, if at all, used in modern herbalism, though it probably merits further investigation. The root bark and stems are analgesic, antirheumatic, antiphlogistic, appetizer, blood purifier, cathartic, emmenagogue, galactagogue, hypoglycaemic, ophthalmic, pectoral and tonic[172, 157]. An infusion is used in the treatment of coughs and colds, bronchitis, tuberculosis, stomach problems etc[257]. A decoction is drunk in the treatment of rheumatism and is also applied externally as a wash on the affected joints[257]. A poultice of the bark has been used to relieve pain in various parts of the body[257]. A poultice of the bark has been applied to a nursing mother's breasts in order to stop an excessive flow of milk[257]. A decoction has been used as an eye wash in the treatment of cataracts and as a herbal steam bath for treating general body pains[257]. The burnt stems, mixed with oil, are applied as a salve on swellings[257]. An extract of the root bark lowers blood sugar levels and an infusion of the bark has been used in the treatment of diabetes[213]. The infusion also has a tonic effect on the blood and liver[213]. The inner bark is emetic in large doses and purgative (especially if taken with hot water)[257]. It is used in the treatment of coughs and colds, stomach and bowel cramps[257]. A poultice of the inner bark is used in the treatment of wounds, sores etc[257]. The berries have been rubbed on the scalp to combat lice and dandruff, and to make the hair shiny[256].

nrakta Western N. America. ksacta Moist woods, especially by streams[11, 60] and usually in rich soils[99].

propta Seed - best sown in a cold frame as soon as it is ripe in the autumn[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division of suckers in the dormant season. Root cuttings in a greenhouse in the winter[188].

nwatta Requires a cool moist soil[11, 200]. Prefers a position in light shade[182]. Prefers dense shade and is probably best if grown in moist woodland[1, 11]. Tolerates maritime exposure[200]. (Rather a strange report for a plant that needs to be grown in dense shade[K]). A very hardy plant, tolerating temperatures down to at least -15°C, but the young shoots in spring can be damaged by late frosts[11, 200]. It is therefore best not grown in a frost pocket[182]. This species was until recently considered to have its range in N. America and Japan, but the Japanese form has now been separated off into its own species as *O. japonicus*[200]. A very ornamental plant, but it is densely armed with spikes[60]. It transplants easily and also tolerates pruning[200]. The leaves and stems are excessively spiny[182].

at risk[111, K]. A polymorphic species, it hybridizes freely with other members of this genus[200].

5.2.382 *Orchis italica*

4 tlin 8 cyuc 2 kcaok 0 tcan 2 dwat 0.3 m hkuc
htut cyutli tcup hwicli hrasjutnyik hpa7tli flatprikhwisslip
hpa7tmwatli xre7t hjonli

drutta *Orchis italica* is a BULB growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf from October to June, in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: DrinkRoot - cooked[2, 4, 46]. It is a source of 'salep', a fine white to yellowish-white powder that is obtained by drying the tuber and grinding it into a powder[2, 105, 177]. Salep is a starch-like substance with a sweetish taste and a faint somewhat unpleasant smell[4]. It is said to be very nutritious and is made into a drink or can be added to cereals and used in making bread etc[100, 183]. One ounce of salep is said to be enough to sustain a person for a day[100, 115].

dwatta Antidiarrhoeal Antiflatulent Demulcent NutriveSalep (see above for more details) is very nutritive and demulcent[4]. It has been used as a diet of special value for children and convalescents, being boiled with water, flavoured and prepared in the same way as arrowroot[4]. Rich in mucilage, it forms a soothing and demulcent jelly that is used in the treatment of irritations of the gastro-intestinal canal[4]. One part of salep to fifty parts of water is sufficient to make a jelly[4]. The tuber, from which salep is prepared, should be harvested as the plant dies down after flowering and setting seed[4].

nrakta Europe. ksacta Calcareous soils in grassland, garigue and open places in pine woodland[230].

propta Seed - surface sow, preferably as soon as it is ripe, in the greenhouse and do not allow the compost to dry out. The seed of this species is extremely simple, it has a minute embryo surrounded by a single layer of protective cells. It contains very little food reserves and depends upon a symbiotic relationship with a species of soil-dwelling fungus. The fungal hyphae invade the seed and enter the cells of the embryo. The orchid soon begins to digest the fungal tissue and this acts as a food supply for the plant until it is able to obtain nutrients from decaying material in the soil[200]. It is best to use some of the soil that is growing around established plants in order to introduce the fungus, or to sow the seed around a plant of the same species and allow the seedlings to grow on until they are large enough to move. Division of the tubers as the flowers fade[230]. This species produces a new tuber towards the end of its growing season. If this is removed from the plant as its flowers are fading, the shock to the plant can stimulate new tubers to be formed. The tuber should be treated as being dormant, whilst the remaining plant should be encouraged to continue in growth in order to give it time to produce new tubers[230]. Division can also be carried out when the plant has a fully developed rosette of leaves but before it comes into flower[230]. The entire new growth is removed from the old tuber from which it has arisen and is potted up, the cut being made towards the bottom of the stem but leaving one or two roots still attached to the old tuber. This can often be done without digging up the plant. The old tuber should develop one or two new growths, whilst the new rosette should continue in growth and flower normally[230].

nwatta Requires a deep rich soil[1]. Best grown in a sunny position in a well-drained bank and a loamy soil[42]. Plants are fairly hardy in Britain but, because they come into growth in the winter, they are best cultivated in a frame or cold greenhouse[230]. Orchids are, in general, shallow-rooting plants of well-drained low-fertility soils. Their symbiotic relationship with a fungus in the soil allows them to obtain sufficient nutrients and be able to compete successfully with other plants. They are very sensitive to the addition of fertilizers or fungicides since these can harm the symbiotic

fungus and thus kill the orchid[230]. This symbiotic relationship makes them very difficult to cultivate, though they will sometimes appear uninvited in a garden and will then thrive. Transplanting can damage the relationship and plants might also thrive for a few years and then disappear, suggesting that they might be short-lived perennials[230]. Plants can succeed in a lawn in various parts of the country. The lawn should not be mown early in the year before or immediately after flowering[200]. Plant out bulbs whilst the plant is dormant, preferably in the autumn[200]. Plants seem to be immune to the predations of rabbits[233]. Cultivated plants are very susceptible to the predation of slugs and snails[230].

5.2.383 *Picea orientalis*

Caucasian Spruce

4 tlin 7 cyuc 2 kcaok 0 tcan 0 dwat 20 m hkuc
hmimhtut cyutli tcup hwicli hrasjutnyik hpa7tli flatprikhwiss
hpa7tmwatli xre7t hjonli

drutta *Picea orientalis* is an evergreen Tree growing to 20 m (65ft) by 5 m (16ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, in flower in May, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

tcanta Resin Tannin WoodTannin is obtained from the bark[74]. Turpentine is obtained from the bark and branches[74]. Wood - soft, white, easily cleaves, light, durable, has a good resonance. Used for construction, furniture etc[74]. It is also valued for its use in the pulp industry to make paper[171].

nrakta E. Europe to W. Asia. ksacta Found in pure stands or mixed with beech, pine and hornbeam, especially on shaded slopes, preferring deep protected ravines with adequate soil moisture at elevations of 300 - 2100 metres[74].

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

nwatta Landscape Uses:Pest tolerant, Screen, Specimen. Likes abundant moisture at the roots, if grown in drier areas it must be given a deep moist soil[11]. Tolerates poor peaty soils[200]. Succeeds in wet cold and shallow soils but is not very wind-firm in shallow soils[1]. Prefers a pH between 4 to 6[200]. Dislikes shade[200]. Intolerant of atmospheric pollution[11]. Resists wind exposure to some degree[200]. In some upland areas, especially over granitic or other base-poor soils, growth rate and health have been seriously affected by aluminium poisoning induced by acid rain[200]. Plants are strongly outbreeding, self-fertilized seed usually grows poorly[200]. They hybridize freely with other members of this genus[200]. There are a number of named forms selected for their ornamental value, most of these are dwarf cultivars[200]. Young trees are slow growing at first but from the age of about 5 - 6 years they can grow up to 1 metre a

can be on the stiff side[1, 11]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. Prefers warmer summers than are usually experienced in Britain, trees often grow poorly in this country and fail to properly ripen their wood resulting in frost damage overwinter[200]. A very ornamental tree[1], it is fast-growing but short-lived in the wild[229]. Seed production is cyclic, a year of high yields being followed by 3 - 4 years of low yields[229]. The tree flowers on new growth produced in spring, the seed taking two summers to ripen[229]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200]. Special Features:Attracts birds, North American native, Inconspicuous flowers or blooms.

5.2.324 *Ilex opaca*

American Holly

4 tlin 8 cyuc 2 kcaok 0 tcan 2 dwat 15 m hkuc
hmimhtut cyutli tcup hwicli hrasjutnyik hpa7tli flatprikhwiss
hpa7tmwatli nyanhjen hjonli

drutta *Ilex opaca* is an evergreen Shrub growing to 15 m (49ft) by 1.5 m (5ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, in flower from May to June, and the seeds ripen from November to December. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

pcista Although no specific reports of toxicity have been seen for this species, the fruits of at least some members of this genus contain saponins and are slightly toxic. They can cause vomiting, diarrhoea and stupor if eaten in quantity[274]. The fruits can cause violent vomiting[222].

kcakta Edible Parts: Edible Uses: TeaThe roasted leaves are used as a tea substitute[161, 177]. They do not contain caffeine[183]. The drink was a very popular tea substitute during the American Civil war[183].

tcanta Dye Hedge Hedge Shelterbelt WoodA number of cultivars of this species are used for hedging[200]. Fairly wind-resistant, this species is also used in shelterbelt plantings[200]. A dye has been made from the berries - the colour is not given[257]. Wood - light, tough, not strong, close grained, highly shock resistant, easily worked[82, 149, 171, 229]. A strikingly white wood, it is valued for use in veneers and inlay[274]. It weighs 36lb per cubic foot[235]. Too small for commercial exploitation, but it is valued for use in cabinet making and the interior finishes of houses[82], it is also used for making small items such as tool handles[149, 171, 229]. The wood can also be stained to imitate ebony[171].

dwatta Antiperiodic Diuretic Emetic Epilepsy Laxative Malaria Ophthalmic SkinThe berries are laxative, emetic and diuretic[222]. They are used in the treatment of children's diarrhoea, colic and indigestion[222]. A tea made from the leaves has been used as a treatment for measles, colds etc[222, 257]. The leaves have also been used externally in the treatment of sore eyes, sore and itchy skin[222, 257]. A tea made from the bark was once used in the treatment of malaria and epilepsy[222]. It has also been used as a wash for sore eyes and itchy skin[257].

nrakta Eastern N. America - Massachusetts to Florida and west to Texas. ksacta Grows in a variety of soil types, but it is generally found in deep moist bottomlands[229]. Moist woods, hedges and fields[43, 184].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. It can take 18 months to germinate. Stored seed generally requires two winters and a summer before it will germinate and should be sown as soon as possible in a cold frame. Scarification, followed by a warm stratification and then a cold stratification may speed up the germination time[78, 80]. The seedlings are rather slow-growing. Pot them up into individual pots when they are large enough to handle and grow them on in light shade in a cold frame for their first year. It is possible to plant them out into a nursery

bed in late spring of the following year, but they should not be left here for more than two years since they do not like being transplanted. Alternatively, grow them on in their pots for a second season and then plant them out into their permanent positions in late spring or early summer. Give them a good mulch and some protection for their first winter outdoors. Cuttings of almost ripe wood with a heel, August in a shaded position in a cold frame. Leave for 12 months before potting up. Layering in October. Takes 2 years.

nwatta Succeeds in most soils so long as they are not water-logged. Fairly wind-resistant[200]. Plants are hardy to about -25°C[184]. A slow-growing and long-lived species in the wild[229], but it does not thrive or fruit well in British gardens[182]. Plants do not thrive in a maritime climate[188]. There are many named forms, selected for their ornamental value[182, 200]. The leaves remain on the plant for about 3 years, falling in the spring[82]. Flowers are produced on the current year's growth[229]. Resents root disturbance, especially as the plants get older[11]. It is best to place the plants into their permanent positions as soon as possible, perhaps giving some winter protection for their first year or two[K]. Plants are very tolerant of pruning and can be cut right back into old wood if required[188]. Dioecious. Male and female plants must be grown if seed is required.

5.2.325 *Osmunda cinnamomea*

Cinnamon Fern

4 tlin 8 cyuc 2 kcaok 0 tcan 1 dwat 0.6 m hkuc
hmimhtut cyutli tcuphia7n hwicli hrasjutnyik hpa7tli frus-
flatprikhwiss hpa7tmwatli hjonli

drutta *Osmunda cinnamomea* is a FERN growing to 0.6 m (2ft) by 0.4 m (1ft 4in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

pcista Although we have found no reports of toxicity for this species, a number of ferns contain carcinogens so some caution is advisable[200]. Many ferns also contain thiaminase, an enzyme that robs the body of its vitamin B complex. In small quantities this enzyme will do no harm to people eating an adequate diet that is rich in vitamin B, though large quantities can cause severe health problems. The enzyme is destroyed by heat or thorough drying, so cooking the plant will remove the thiaminase[172].

kcakta Edible Parts: LeavesEdible Uses: The young unexpanded fronds are eaten as a nibble or cooked in soups[46, 61, 62, 116, 159, 183, 257]. The taste is said to resemble asparagus[200]. The young shoots are seen as a 'spring tonic' to cleanse the body with fresh green food after a long winter eating mainly stored foods[257]. The latent buds can be eaten in early spring, they rival chestnuts in size and flavour[95].

dwatta Analgesic Antirheumatic GalactagogueA decoction of the root has been rubbed into affected joints as a treatment for rheumatism[257]. The root has been chewed, a small portion swallowed and the remainder applied to a snakebite[257]. The following reports do not state which part of the plant is being used, though it is most likely that the root is being referred to. The plant is analgesic, antirheumatic and galactagogue[257]. A decoction is used internally in the treatment of headaches, joint pain, rheumatism, colds etc, and also to promote the flow of milk in a nursing mother[257].

nrakta Eastern N. America - Newfoundland to Florida, S. America, E. Asia. ksacta Sandy or alluvial soils[159] in swamps low woods and thickets in Eastern N. America[43]. Moist areas, acidic soils, frequently in vernal seeps from sea level to 2300 metres[270].

propta Spores - they very quickly lose their viability (within 3 days) and are best sown as soon as they are ripe on the surface of a humus-rich sterilized soil in a lightly shaded place in a greenhouse. Keep the compost moist, preferably by putting a plastic bag over the pot. Plants develop very rapidly, pot on small clumps of plantlets as soon as they are large enough to handle and keep humid until they are well established. Do not plant outside until the ferns are at least 2 years old. Cultivars usually come true to type[200]. Division of the rootstock in the dormant season. This is a very strenuous exercise due to the mass of wiry roots[200].

nwatta Landscape Uses:Border, Container, Ground cover, Rock garden, Specimen, Woodland garden. Easily grown in a damp woodland or by the margins of pools and streams[187]. Likes a soil of swamp mud and loamy or fibrous peat, sand and loam[1]. Succeeds in most moist soils, preferring acid conditions[200]. Requires a constant supply of water, doing well by ponds, streams etc[1]. Plants thrive in full sun so long as there is no shortage of moisture in the soil and also in shady situations beneath shrubs etc[200]. Requires a shady position[188]. Plants are hardy to at least -20°C, they are evergreen in warm winter areas but deciduous elsewhere[200]. This species is sometimes cultivated for its edible fronds[200]. Members of this genus are rarely if ever troubled by browsing deer[233]. A very ornamental plant[1]. The rhizome is large and slowly creeping[187]. Special Features:Attractive foliage, North American native, Naturalizing, Wetlands plant, There are no flowers or blooms.

5.2.326 Quercus aliena

Oriental White Oak
4 tlin 8 cyuc 2 kcaak 0 tcan 2 dwat 20 m hkuc
hmmhtut cyutli tcup hwicli jlutnyik hpa7tli flatprklwis hpa7tmwatli hjonli

drutta *Quercus aliena* is a deciduous Tree growing to 20 m (65ft) by 15 m (49ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to May, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: CoffeeSeed - cooked[105, 177]. The seed is about 25mm long, it can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed contains bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute.

tcanta Repellent Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. Wood. Of local value, it is used mainly for boat building[61].

dwatta Astringent DysenteryAny galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta E. Asia - China, Japan, Korea. ksacta Woods, 1000 - 1600 metres in W. China[109]. Mixed mesophytic forests at elevations of 100 - 2700 metres[266].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Lime tolerant[188]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200].

Prefers warmer summers than are usually experienced in Britain, trees often grow poorly in this country and fail to properly ripen their wood resulting in frost damage overwinter[200]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. The seed ripens in its first year[200]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200].

5.2.327 Ptelea trifoliata mollis

Hop Tree
4 tlin 8 cyuc 2 kcaak 0 tcan 3 dwat m hkuc
hmmhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprklwis hpa7tmwatli xre7t hjonli

drutta *Ptelea trifoliata mollis* is a deciduous Tree growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to July, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcasta This species can cause photosensitization of the skin[274].

kcakta Edible Parts: FruitEdible Uses: Fruit - raw[2]. Eaten by young children[161, 257]. The fruit is also used as a hop substitute when making beer and it is added to yeast to make it rise more quickly when making bread[159, 183]. The fruit is produced abundantly in Britain[61], though very little of it is fertile[11]. The fruit is about 25mm long[200].

tcanta WoodWood - hard, heavy, close grained[82, 149]. It weighs 43lb per cubic foot[235].

dwatta Anthelmintic Antibacterial Antiperiodic Malaria Stomachic TonicThe root-bark is anthelmintic, antibacterial, antiperiodic, stomachic and tonic[4, 21, 46, 82, 238]. It has been mixed with other medicines in order to give added potency[213, 222]. It has a soothing influence on the mucous membranes and promotes the appetite, being tolerated when other tonics cannot be retained[4]. It is also taken in the treatment of intermittent fevers such as malaria, heartburn, roundworms, pinworms and poor digestion[238]. Externally it is applied to wounds[238]. The roots are harvested in the autumn, the bark peeled off and dried for later use[238]. The roots are a tonic, used in the treatment of asthmatic breathing, fevers, poor appetite etc[222]. The leaves are said to be useful in the treatment of wounds and also in the destruction of intestinal worms[213, 222].

nrakta Eastern N. America - North Carolina and Georgia to Indiana. ksacta Moist places, rocky slopes, edges of woods[21], alluvial thickets and gravels[43].

propta Seed - best sown as soon as it is ripe in a cold frame[200]. Stored seed requires 3 months cold stratification at 5°C and should be sown as early as possible in the year[113]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Very little of the seed produced in Britain is viable[11]. Cuttings of half-ripe wood, July/August in a frame[113]. Layering.

nwatta Succeeds in any fertile well-drained moisture retentive soil in full sun or light part day shade[11, 200]. The young growth in spring can be damaged by late frosts. A very ornamental plant[50]. This sub-species is the form that is eaten by children[161]. Plants in this genus are notably resistant to honey fungus[200].

5.2.328 Aralia schmidtii

Sakhalin Spikenard
4 tlin 8 cyuc 2 kcaak 0 tcan 0 dwat 3 m hkuc
pcimhmim cyutli tcup hwicli hyhshrasjlutnyik hpa7tli flatprklwis hpa7tmwatli xre7t hjonli

drutta *Aralia schmidtii* is a PERENNIAL growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and

dwatta Anticholesterolemic AstringentThe bark is astringent and slightly anticholesterolemic[7]. A decoction has been used to bathe the sore eyes[7]. The bark should be sundried and then stored in a dry place until required[7].

nrakta Europe, including Britain, from Sweden to Spain and east to western Asia and the Caucasus. ksacta Open deciduous woods, hedgerows and scrub, usually on basic soils[17].

propta Seed - best sown as soon as it is ripe in a cold frame, it usually germinates in the following spring. Pre-soak stored seed for 24 hours and then stratify for 2 - 4 months at 1 - 8°C. It can be slow to germinate. The seed can be harvested 'green' (when it has fully developed but before it has dried and produced any germination inhibitors) and sown immediately. It should germinate in late winter. If the seed is harvested too soon it will produce very weak plants or no plants at all[80, 113]. When large enough to handle, prick the seedlings out into individual pots and grow them on until they are 20cm or more tall before planting them out in their permanent positions. Layering, which takes about 12 months, is successful with most species in this genus. Cuttings of young shoots in June or July. The cuttings should have 2 - 3 pairs of leaves, plus one pair of buds at the base. Remove a very thin slice of bark at the base of the cutting, rooting is improved if a rooting hormone is used. The rooted cuttings must show new growth during the summer before being potted up otherwise they are unlikely to survive the winter.

nwatta Landscape Uses:Firewood, Pollard, Screen, Standard, Superior hedge, Specimen, Street tree. Of easy cultivation, it prefers a good moist well-drained soil[11] in a sunny position but tolerates some shade[11, 200]. Does well on chalky soils, tolerating a pH as high as 8, but becoming a shrub in such conditions[186]. Does not thrive in soils with a pH much below 6[186]. Grows well in heavy clay soils. Tolerates atmospheric pollution[200]. Growth is fast once the trees are established, but this later slows down and trees take about 50 years to reach maturity[186]. Frequently found as a shrub in light woodland, especially under oak. It is one of the first trees to colonize chalk grassland[186]. The field maple is a bad companion plant, inhibiting the growth of nearby plants[18, 20]. A good bee plant[7]. This species has often been coppiced in the past for its wood[17]. Trees produce seed in about 10 years from sowing[98]. Special Features: Not North American native, Inconspicuous flowers or blooms.

5.2.380 Polygonatum commutatum

King Solomon's Seal, Smooth Solomon's seal
4 tlin 8 cyuc 2 kcaak 0 tcan 1 dwat 2 m hkuc
pcimhmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatprklwis hpa7tmwatli fyixre7t hjonli

drutta *Polygonatum commutatum* is a PERENNIAL growing to 2 m (6ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

pcasta The fruit and seed are thought to be poisonous[65].

kcakta Edible Parts: Leaves RootEdible Uses: Young shoots - cooked. They can be used as an asparagus substitute. Root - cooked[22, 161]. A parsnip-like flavour[212]. Rich in starch, it can be dried and ground into a powder then used as a thickener in soups etc or can be added to flour when making cakes, bread or whatever[46, 61]. The root should be boiled and sun-dried nine times, it is then delicious[179] (if there is anything left!:[K])

tcanta IncenseThe root has been burnt in the house for its pleasant fragrance[257].

dwatta AnalgesicA decoction of the root has been used as a herbal steam inhalant as a treatment for headaches[257].

nrakta Eastern N. America - Rhode Island to Ontario and Manitoba, south to Georgia, New Mexico and Arizona. ks-

acta Moist woodland and copses, often by streams[43, 235]. Plants are rarely found in dry soils[235].

propta Seed - best sown as soon as it is ripe in early autumn in a shady part of a cold greenhouse[200]. Sow stored seed as early in the year as possible. Germination can be slow, they may not come true to type[200] and it takes a few years for them to reach a good size. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a shady position in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in March or October. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Prefers a fertile humus rich moisture retentive well-drained soil in cool shade or semi-shade[200]. Plants are intolerant of heat and drought but tolerate most other conditions[200]. Grows well in woodlands and copses[1, 42]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. The young shoots are very attractive to slugs[4]. Hybridizes with other members of this genus[200]. According to one report this species is no more than a synonym for *P. biflorum*[200].

5.2.381 Hosta montana

4 tlin 8 cyuc 2 kcaak 0 tcan 0 dwat m hkuc
hmmhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprklwis hpa7tmwatli xre7t hjonli

drutta *Hosta montana* is a PERENNIAL growing to 1 m (3ft 3in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from September to October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves StemEdible Uses: Young leaves - cooked[116]. White part of the leaf stem - cooked[105].

nrakta E. Asia - Japan. ksacta Woodlands and forest margins[251] in the hills and mountains of northern and central Japan[58].

propta Seed - sow spring in a lightly shaded position in a greenhouse and only just cover the seed. Germination usually takes place within 1 - 3 months at 10°C. Make sure you keep the compost moist. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division is possible at almost any time of the year so long as there is sufficient moisture[233]. It is best carried out in March as growth commences or in early autumn if the soil is not too dry[200]. Hostas can be left undivided for many years and should not be divided any more frequently than once every 3 - 5 years to allow the leaves to reach maturity[200].

nwatta Thrives in most fertile soils if they are rich in humus[200]. Grows well in heavy clay soils and in sandy ones[208]. Very limy soils inhibit growth, but plants can thrive in such a situation if plenty of humus is added[208]. Prefers a pH between 6 and 7[200]. Requires a rich soil that does not dry out readily[1]. Succeeds in full sun as well as in deep shade, growing well in the semi-shade of a woodland[200, 233]. In general, the sunnier the position the moister the soil should be[233]. Plants are best not grown under trees in town gardens since the soil washed from the leaves of the trees in wet weather will tend to remain on the hosta[208]. Plants flower better when grown in a sunny position but the foliage is better when the plant is in a shady position[200]. Plants are in general fully hardy in Britain, but young leaves in spring can be destroyed by frost. New leaves are only produced in the spring and very early summer, so any damage at this time has a deep effect on the plant[233]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Plants are very attractive to slugs and snails, the young shoots in spring are especially

pregnant women[254]. The whole plant is astringent, carminative, demulcent, diuretic, expectorant, laxative, refrigerant, vulnerary[4, 7, 9, 21, 54, 165, 222]. Taken internally it is useful in the treatment of chest complaints and in small quantities it also aids digestion[254]. It can be applied as a poultice and will relieve any kind of roseola and is effective wherever there are fragile superficial veins[7]. An infusion of the fresh or dried herb can be added to the bath water and its emollient property will help to reduce inflammation - in rheumatic joints for example - and encourage tissue repair[254]. Chickweed is best harvested between May and July, it can be used fresh or be dried and stored for later use[4, 238]. A decoction of the whole plant is taken internally as a post-partum depurative, emmenagogue, galactagogue and circulatory tonic[218]. It is also believed to relieve constipation and be beneficial in the treatment of kidney complaints[244]. The decoction is also used externally to treat rheumatic pains, wounds and ulcers[4, 218, 222]. The expressed juice of the plant has been used as an eyewash[244].

nrakta A cosmopolitan plant, found in most regions of the world, including Britain. **ksacta** Growing almost anywhere, it is a common garden weed[7, 17].

propta Seed - this species should not need any encouragement, you are much more likely to be trying to get rid of it than trying to introduce it (eating it is one way of doing that!)[K].

nwatta A very easily grown plant, it prefers a moist soil and a position in full sun or partial shade[52, 238]. It can be very lush and vigorous when grown in a fertile soil[1], but in infertile soils it will flower and set seed whilst still very small. A very common garden weed, chickweed grows, flowers and sets seed all year round. The flowers open around 9 o'clock in the morning and remain open for about 12 hours[4]. They do not open in dull weather[4]. The leaves fold up of a night time, enfolding and protecting the tender buds of new shoots[4]. A food plant for the caterpillars of many butterfly species. **Special Features:** Edible, Not North American native, Invasive, Naturalizing, Suitable for cut flowers, Suitable for dried flowers, Extended bloom season in Zones 9A and above. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A self-seeding annual [1-2]. A clumping mat former. Forming a dense prostrate carpet spreading indefinitely [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2].

5.2.378 Oxalis corniculata

Yellow Sorrel, Creeping woodsorrel

4 tlin 8 cyuc 2 kcaak 0 tcan 2 dwat 0.1 m hkuc htut cyutli kyuctup hwicli hrasjlutnyik hpa7tli flatprikliw hpa7tmwatli fyfxre7t hjonli

drutta *Oxalis corniculata* is an ANNUAL/PERENNIAL growing to 0.1 m (0ft 4in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

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

ksakta **Edible Parts:** Flowers **Leaves****Edible Uses:** Gum-Leaves - raw or cooked[2, 46, 61, 105]. Added to salads, cooked as a potherb with other milder flavoured greens or used to give a sour flavour to other foods[183]. The leaves are available all year round unless the winter is very cold, they have a pleasantly sour taste[114], but are very small and fiddly to harvest[K]. The leaves contain about 86% water, 2.3% protein, 0.8% fat, 8.2% carbohydrate, 150mg calcium, 78mg phosphorus, 8mg iron, 0.6mg niacin, 78mg vitamin C,

6050µg beta carotene[173]. The leaves contain between 7 - 12% oxalate[218]. Use in moderation, see notes at top of sheet, **Flowers** - raw. A nice acid flavour and a pleasant addition to the salad bowl[K].

tcanta **Dye** Gum **Miscellany**A slimy substance collects in the mouth when the leaves are chewed, this is used by magicians to protect the mouth when they eat glass[114]. Yellow, orange and red to brown dyes are obtained from the flowers[168]. The boiled whole plant yields a yellow dye[257].

dwatta **Anthelmintic** **Antiphlogistic** **Antiscorbutic** **Astringent** **Depurative** **Diuretic** **Emmenagogue** **Febriifuge** **Lithotropic** **Miscellany** **Stomachic** **Styptic** **Urinary** **Vitamin C**The whole plant is anthelmintic, antiphlogistic, astringent, depurative, diuretic, emmenagogue, febrifuge, lithotropic, stomachic and styptic[147, 178, 218, 240]. It is used in the treatment of influenza, fever, urinary tract infections, enteritis, diarrhoea, traumatic injuries, sprains and poisonous snake bites[147]. The juice of the plant, mixed with butter, is applied to muscular swellings, boils and pimples[272]. An infusion can be used as a wash to rid children of hookworms[257]. The plant is a good source of vitamin C and is used as an antiscorbutic in the treatment of scurvy[240]. The leaves are used as an antidote to poisoning by the seeds of *Datura* spp, arsenic and mercury[218]. The leaf juice is applied to insect bites, burns and skin eruptions[218]. It has an antibacterial activity[218].

nrakta Original habitat is obscure, it is naturalized in Britain. **ksacta** Arable land and waste places, it is a common garden weed[9, 17] where it tends to become especially troublesome in pots of plants growing in greenhouses etc[200].

propta Seed - best sown as soon as ripe in a cold frame. This plant does not need any encouragement.

nwatta A very easily grown plant, succeeding in a sandy soil in a warm dry position[1]. It prefers dry open habitats[50]. Spreading rapidly by seed and underground bulbils, this species can quickly become a nuisance, it is a common weed of pot plants in nurseries[200].

5.2.379 Acer campestre

Field Maple, Hedge maple

4 tlin 8 cyuc 2 kcaak 0 tcan 1 dwat 15 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikliw hpa7tmwatli hjonli

drutta *Acer campestre* is a deciduous Tree growing to 15 m (49ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from May to June, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

ksakta The sap contains a certain amount of sugar and can either be used as a drink, or can be concentrated into a syrup by boiling off the water[4]. The concentration of sugar is considerably lower than in the sugar maples (*A. saccharum*). The syrup is used as a sweetener on many foods. The tree trunk is tapped in the early spring, the sap flowing better on warm sunny days following a frost. The best production comes from cold-winter areas with continental climates.

tcanta **Charcoal** **Fuel** **Hedge** **Hedge** **Preservative** **Wood**The leaves are packed around apples, rootcrops etc to help preserve them[18, 20]. A fast growing plant and bearing clipping well, it makes an excellent clipped hedge and can also be used as part of a native wildlife hedge where it is only trimmed every 3 - 4 years[200, K]. It has also been used in topiary[200]. **Wood** - fine-grained, tough, elastic, hard to split, takes a high polish and is seldom attacked by insects. Trees are seldom large enough to supply much usable timber, but when available it is much valued by cabinet makers[4, 7, 13, 46, 115]. It is also used for cups bowls etc[115]. The wood of the roots is often knotted and is valued for small objects of cabinet work[4]. The wood is an excellent fuel[4]. A charcoal made from the wood is a good fuel[4, 115].

female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

ksakta **Edible Parts:** Leaves **Root** **Stem****Edible Uses:** The following uses are for the closely related *A. cordata*. It is quite possible that they also apply to this species[K]. **Shoots** - cooked or raw[2, 46, 61, 105, 177]. They can be up to 1.5 metres long and have a mild and agreeable flavour[116]. They are usually blanched and are crisp and tender with a unique lemon-like flavour[183]. They can be sliced and added to salads, soups etc[206]. The shoots contain about 1.1% protein, 0.42% fat, 0.8% soluble carbohydrate, 0.55% ash[179]. **Root** - cooked[22, 105, 177]. Used like scorzonera[2].

nrakta **E. Asia** - **N. Japan.** **ksacta** **Thickets** and thin woods, esp. by streams and ravines[58, 275].

propta **Seed** - best sown as soon as ripe in a cold frame. Stored seed requires 3 - 5 months of cold stratification. Germination usually takes place within 1 - 4 months at 20°c[134]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in a greenhouse for at least their first winter. Once the plants are 25cm or more tall, they can be planted out into their permanent positions, late spring or early summer being the best time to do this. **Root** cuttings 8cm long, December in a cold frame[11, 78]. Store the roots upside down in sand and pot up in March/April. High percentage[78]. **Division** of suckers in late winter[11]. Very easy, the suckers can be planted out direct into their permanent positions if required.

nwatta **Prefers** a deep moderately fertile moisture-retentive well-drained loam and a semi-shady position[1, 11, 200]. Requires a sheltered position[200]. Plants are hardier when grown in poorer soils[200]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. The young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. This species is closely related to *A. racemosa*[200]. The rootstock is similar to *A. cordata*[200]. It is considered to be no more than a subspecies of *A. cordata* by some botanists[275].

5.2.329 Hosta undulata

4 tlin 8 cyuc 2 kcaak 0 tcan 0 dwat 0.3 m hkuc pcmhmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikliw hpa7tmwatli xre7t hjonli

drutta *Hosta undulata* is a PERENNIAL growing to 0.3 m (1ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

ksakta **Edible Parts:** Leaves **Root** **Stem****Edible Uses:** Young leaves and leaf stems - cooked[105, 177]. **Root**[105, 177]. No more details are given.

tcanta A good ground cover plant, succeeding in dense shade but rather slow to spread[197]. Plants should be spaced about 25cm apart each way[208]. The sub-species *H. undulata* *erromena* has been specially mentioned[197] and this can be spaced about 60cm apart each way[208].

nrakta This species is a hybrid of garden origin. **ksacta** Not known in a truly wild situation.

propta **Seed** - sow spring in a lightly shaded position in a greenhouse and only just cover the seed. Germination usually takes place within 1 - 3 months at 10°c. Make sure you keep the compost moist. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. **Division** is possible at almost any time of the year so long as there is sufficient moisture[233]. It is best carried out in March as growth commences or in early autumn if the soil is not too dry[200]. **Hostas** can be left undivided for many years and

should not be divided any more frequently than once every 3 - 5 years to allow the leaves to reach maturity[200].

nwatta **Thrives** in most fertile soils if they are rich in humus[200]. Grows well in heavy clay soils and in sandy ones[208]. Very limy soils inhibit growth, but plants can thrive in such a situation if plenty of humus is added[208]. **Prefers** a pH between 6 and 7[200]. Requires a rich soil that does not dry out readily[1]. Succeeds in full sun as well as in deep shade, growing well in the semi-shade of a woodland[200, 233]. In general, the sunnier the position the moister the soil should be[233]. Plants are best not grown under trees in town gardens since the soil washed from the leaves of the trees in wet weather will tend to remain on the hosta[208]. Plants flower better when grown in a sunny position but the foliage is better when the plant is in a shady position[200]. Plants are in general fully hardy in Britain, but young leaves in spring can be destroyed by frost. New leaves are only produced in the spring and very early summer, so any damage at this time has a deep effect on the plant[233]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Plants are very attractive to slugs and snails, the young shoots in spring are especially at risk[111, K]. A vigorous plant, forming medium sized clumps[200]. A hybrid species of garden origin, the flowers are sterile[200].

5.2.330 Juniperus horizontalis

Creeping Juniper, Horizontal Juniper

4 tlin 9 cyuc 2 kcaak 3 tcan 1 dwat 1 m hkuc htut cyutli hgatkyuctup hwicli hrasjlutnyik hpa7tli flatprikliw hpa7tmwatli nyanhjen hjonli

drutta *Juniperus horizontalis* is an evergreen Shrub growing to 1 m (3ft 3in) by 3 m (9ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in leaf all year, and the seeds ripen in October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline and saline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

ksakta **Edible Parts:** **Edible Uses:** Coffee TeaThe fruits are roasted and used in the preparation of a coffee-like beverage[183]. A tea is made from the young branch tips[183, 257].

tcanta **Baby** **care** **Incense****Landscape** **Uses:** Cascades, Erosion control, Ground cover, Massing, Rock garden, Seashore. A good ground cover plant for a sunny position[208], eventually making a dense cover though it requires weeding for the first year or so[197]. The bark has been crushed and used as a soft hygienic pad in cradles[257]. It has also been used to make mats[257]. The young twigs and leaves have been burnt as an incense[257].

dwatta **Diaphoretic** **Febriifuge** **Kidney**An infusion of the branches, or fleshy cones, has been used in the treatment of coughs, colds and fevers[257]. The cones or branches can also be used as a steam bath[257]. An infusion of the seeds has been used in the treatment of kidney problems[257].

nrakta **Northern N. America** - **Newfoundland** to **British Columbia**, south to **Washington** and **Maine.** **ksacta** **Dry** **rocky** **soil**, **sterile** **pastures** **and** **fields**[204].

propta **The** **seed** **requires** **a** **period** **of** **cold** **stratification.** The seed has a hard seedcoat and can be very slow to germinate, requiring a cold period followed by a warm period and then another cold spell, each of 2 - 3 months duration[78, 81]. Soaking the seed for 3 - 6 seconds in boiling water may speed up the germination process[11]. The seed is best sown as soon as it is ripe in a cold frame. Some might germinate in the following spring, though most will take another year. Another possibility is to harvest the seed 'green' (when the embryo has fully formed but before the seedcoat has hardened). The seedlings can be potted up into individual pots when they are large enough to handle. Grow on in pots until large enough, then plant out in early summer. When stored dry, the seed can remain viable for several years[1]. **Cuttings** of mature wood, 5 - 10cm with a heel, September/October in

a cold frame. Plant out in the following autumn[1, 78]. Laying in September/October. Takes 12 months[78].

nwatta Succeeds in a sunny position in most soils so long as they are well drained, preferring a neutral or slightly alkaline soil[11] and succeeding on chalk[200]. Succeeds in dry soils[200]. An aggregate species[204]. There are many named varieties selected for their ornamental value[200]. 'Bar Harbour' is very salt-resistant[200]. Dioecious, male and female plants must be grown if seed is required. Special Features: North American native, Fragrant foliage, Inconspicuous flowers or blooms. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is flat with shallow roots spreading near the soil surface [2-1].

5.2.331 Helianthus petiolaris

Prairie Sunflower

4 tlin 8 cyuc 2 kcaak 0 tcan 1 dwat 3 m hkuc htut cyutli kyuctup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Helianthus petiolaris is a ANNUAL growing to 3 m (9ft 10in). See above for USDA hardness. It is hardy to UK zone 4. It is in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcaakta Edible Parts: SeedEdible Uses: Seed - raw or cooked. An oily texture[161, 177]. The seed can be ground into a powder and kneaded into seed butter[257].

dwatta SalveThe powdered leaves, either on their own or in an ointment, have been used as a dressing for sores and swellings[257].

nrakta Central to western N. America - Manitoba and Minnesota south to Arizona. ksacta Sandy soils[43]. Dry prairies[235].

propta Seed - sow in mid spring in situ. An earlier start can be made by sowing 2 - 3 seeds per pot in a greenhouse in early spring. Use a fairly rich compost. Thin to the strongest seedling, give them an occasional liquid feed to make sure they do not become nutrient deficient and plant them out in late spring or early summer.

nwatta Succeeds in most soils in a sunny position[1]. Requires a rich soil[1]. Dislikes shade[1]. Grows well on dry soils[200]. The young growth is extremely attractive to slugs, plants can be totally destroyed by them[K]. This species hybridizes in the wild with *H. annuus*[274]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233].

5.2.332 Chenopodium ficifolium

Fig-Leaved Goosefoot

4 tlin 8 cyuc 2 kcaak 0 tcan 0 dwat 0.9 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Chenopodium ficifolium is a ANNUAL growing to 0.9 m (3ft). See above for USDA hardness. It is hardy to UK zone 4. It is in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista The leaves and seeds of all members of this genus are more or less edible. However, many of the species in this genus contain saponins, though usually in quantities too small to do any harm. Although toxic, saponins are poorly absorbed by the body and most pass straight through without any problem. They are also broken down to a large extent in the cooking process. Saponins are found in many foods, such as some beans. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to

stupefy or kill the fish[K]. The plants also contain some oxalic acid, which in large quantities can lock up some of the nutrients in the food. However, even considering this, they are very nutritious vegetables in reasonable quantities. Cooking the plants will reduce their content of oxalic acid. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcaakta Edible Parts: Leaves SeedEdible Uses: Condi-mentLeaves and flower buds - cooked[12, 105, 177]. Used like spinach or added to soups etc[183]. The raw leaves should only be eaten in small quantities, see the notes above on toxicity. Seed - roasted and used as a condiment[105]. Used like sesame for flavouring foods[183].

tcanta DyeGold/green dyes can be obtained from the whole plant[168].

nrakta Central and southern Europe, including Britain, south and east to N. Africa and central Asia. ksacta Waste ground and arable land, especially on rich soils and near compost heaps. Avoids acid soils[17].

propta Seed - sow spring in situ. Most of the seed usually germinates within a few days of sowing.

nwatta An easily grown plant, succeeding in most soils but disliking shade[1, 200]. It prefers a moderately fertile soil[200].

5.2.333 Crataegus sanguinea

4 tlin 8 cyuc 2 kcaak 0 tcan 2 dwat 6 m hkuc hmimhtut cyutli hgattcuphia7n hwicli hrasjlutnyikfrip hpa7tli flatprikliwislip hpa7tmwatli xre7t hjonli

drutta Crataegus sanguinea is a deciduous Shrub growing to 6 m (19ft 8in). See above for USDA hardness. It is hardy to UK zone 4 and is not frost tender. It is in flower from May to June, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcaakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 105, 177]. The fruit can be used in making pies, preserves, etc, and can also be dried for later use. It is about 1cm in diameter[200]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Hedge HedgeVery tolerant of trimming, it can even be cut right back into the old wood and will soon re-sprout. It makes a good hedge[74]. Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta E. Asia - northern China, Mongolia, Siberia. ksacta Open forests, forest edges, river banks etc[74].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to

5.2.375 Muscari neglectum

Grape Hyacinth, Starch grape hyacinth

4 tlin 7 cyuc 2 kcaak 0 tcan 0 dwat 0.3 m hkuc htut cyutli kyuctup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyfkr7t hjonli

drutta Muscari neglectum is a BULB growing to 0.3 m (1ft) by 0.1 m (0ft 4in) at a medium rate. See above for USDA hardness. It is hardy to UK zone 4 and is not frost tender. It is in flower from April to May, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by insects. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

pcista The bulb is poisonous[4]. It contains a substance called comisic acid, which is said to act like saponin[4]. Although poisonous, saponins are poorly absorbed by the human body and so most pass through without harm. Saponins are quite bitter and can be found in many common foods such as some beans. They can be removed by carefully leaching the seed or flour in running water. Thorough cooking, and perhaps changing the cooking water once, will also normally remove most of them. However, it is not advisable to eat large quantities of food that contain saponins. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K].

kcaakta Edible Parts: Flowers RootEdible Uses: Bulb - cooked[2, 132, 177, 183]. The bulb is up to 25mm in diameter[200]. One report says that the bulb might be poisonous[4]. The flowers, sprinkled over rhubarb, add a wonderful scented flavour[183].

tcanta Landscape Uses: Border, Container, Massing, Rock garden, forest garden.

nrakta Mediterranean region, north to Britain, Belgium, Germany and S. Russia. ksacta Dry grassland in sandy soils[4, 17].

propta Seed - best sown as soon as ripe in a greenhouse[200]. The seed can also be sown in early spring in a greenhouse. A good proportion of the seed usually germinates within 2 - 3 months. Sow the seed thinly so that the seedlings can be left undisturbed in the pot for their first year of growth. Give them an occasional liquid feed in the growing season to ensure they do not become nutrient deficient. When the plants become dormant in late summer, pot up the small bulbs placing 2 - 3 bulbs in each pot. Grow them on for another one or two years in the greenhouse before planting them out when they are dormant in late summer. Division of offsets in July/August after the leaves die down[1]. It can be done every other year if a quick increase is required[1]. Larger bulbs can be replanted direct into their permanent positions, but it is best to pot up the smaller bulbs and grow them on in a cold frame for a year before planting them out when they are dormant in late summer.

nwatta Prefers a rich open well-drained soil and a sunny position[1, 90]. Easily grown in any well-drained soil[90]. Grows very well in short grass[1], increasing freely[42] and it can become invasive[200]. A very variable plant[89, 200]. The flowers secrete lots of nectar and are a valuable bee plant in the spring[4]. The flowers are said to have a smell like wet starch[4] whilst another report says that they are deliciously plum-scented[245]. Special Features:Attractive foliage, Naturalizing, Fragrant flowers.

5.2.376 Aronia prunifolia

Purple Chokeberry

4 tlin 8 cyuc 2 kcaak 0 tcan 0 dwat 3 m hkuc hmimhtut cyutli kyuctup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Aronia prunifolia is a deciduous Shrub growing to 3 m (9ft) by 2.5 m (8ft). See above for USDA hardness. It is hardy to UK zone 4. It is in flower from July to August, and the seeds ripen from October to December. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline)

soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcaakta Edible Parts: FruitEdible Uses: Fruit - dried and used for making pemmican. The fruit is about 8mm in diameter[200].

nrakta Eastern N. America. ksacta Low woodlands[200].

propta Seed - best sown as soon as it is ripe in pots outdoors or in a cold frame[113]. Pre-soak stored seed overnight and then cold stratify for 3 months at 2°C[113]. The seed germinates in 1 - 3 months at 15°C[134]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter. Plant out in late spring. Since this species is believed to be a hybrid it will probably not breed true from seed. Cuttings of half-ripe wood, July/August in a frame[113]. Division of suckers in the dormant season[200]. Very easy, they can be planted straight out into their permanent positions. Laying[200].

nwatta Prefers a moist peaty soil in full sun or partial shade[200]. Succeeds in most soils but dislikes shallow chalk[200]. Plants are hardy to about -25°C[200]. This genus is closely related to *Sorbus* species[200]. Plants in this genus are notably resistant to honey fungus[200]. This species is probably a naturally occurring hybrid, *A. arbutifolia* x *A. melanocarpa*[200].

5.2.377 Stellaria media

Chickweed, Common chickweed

4 tlin 11 cyuc 2 kcaak 2 tcan 3 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli fyfkr7t hjonli

drutta Stellaria media is a ANNUAL growing to 0.1 m (0ft 4in) by 0.5 m (1ft 8in) at a fast rate. See above for USDA hardness. It is hardy to UK zone 4 and is not frost tender. It is in leaf all year, in flower all year, and the seeds ripen all year. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The leaves contain saponins[7, 65]. Although toxic, these substances are very poorly absorbed by the body and so tend to pass through without causing harm. They are also broken down by thorough cooking. Saponins are found in many plants, including several that are often used for food, such as certain beans. It is advisable not to eat large quantities of food that contain saponins. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K]. Report of paralysis attributed to excessive intake. Should not be used during pregnancy or during breastfeeding [301].

kcaakta Edible Parts: Leaves SeedEdible Uses: Young leaves - raw or cooked as a potherb[2, 7, 9, 12, 52, 54, 183]. They can be available all year round if the winter is not too severe[85]. Very nutritious, they can be added to salads whilst the cooked leaves can scarcely be distinguished from spring spinach[4, K]. The leaves contain saponins so some caution is advised, see the note on toxicity at the top of the page. A nutritional analysis is available[218]. Seed - ground into a powder and used in making bread or to thicken soups[172, 183]. It would be very fiddly to harvest any quantity of this seed since it is produced in small quantities throughout most of the year and is very small[K]. The seed contains 17.8% protein and 5.9% fat[218].

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

dwatta Antirheumatic Astringent Carminative Demulcent Depurative Diuretic Emmenagogue Expectorant Galactagogue Kidney Laxative Ophthalmic Poultice Refrigerant TB VulneraryChickweed has a very long history of herbal use, being particularly beneficial in the external treatment of any kind of itching skin condition[238]. It has been known to soothe severe itchiness even where all other remedies have failed[254]. In excess doses chickweed can cause diarrhoea and vomiting[254]. It should not be used medicinally by

into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta We have very little information on this species and do not know if it will succeed in Britain, though judging by its native range it should succeed outdoors in most parts of the country. According to one report this species is no more than a synonym of *P. frigidus*[60]. The following notes are based on the general needs of the genus. Succeeds in ordinary garden soil[1], but prefers a deep fertile humus-rich soil that is permanently moist but not stagnant, succeeding in shade, semi-shade or full sun[200]. Prefers partial shade[31]. Plants can be grown in quite coarse grass, which can be cut annually in the autumn[233]. A very invasive plant, too rampant for anything other than the wild garden[187, 200]. Dioecious, male and female plants must be grown if seed is required.

5.2.373 *Ambrosia artemesiifolia*

Roman Wormwood, Bitterweed, Blackweed, Carrot Weed, Hay Fever Weed, Stickeweed, Tassel Weed, Wild Ta
4 tin 8 cyuc 2 kcaak 1 tcan 3 dwat 0.9 m hkc
hmmhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikldwis hpa7tmwatli hjonli

drutta *Ambrosia artemesiifolia* is a ANNUAL growing to 0.9 m (3ft) by 0.2 m (0ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from August to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The pollen of this plant is a major cause of hayfever in N. America[207, 222]. Ingesting or touching the plant can cause allergic reactions in some people[222].

kcaakta Edible Parts: OilEdible Uses: OilAn oil is obtained from the seed. It has been suggested for edible purposes because it contains little linolenic acid[61, 183]. The seed contains up to 19% oil[61], it has slightly better drying properties than soya bean oil[183].

tcanta Disinfectant OilThere is some indication it has been used as a disinfectant and Oil.

dwatta Antidote Astringent Disinfectant Emetic Febrifuge Women's complaintsThe leaves are very astringent, emetic and febrifuge[222, 257]. They are applied externally to insect bites, rheumatic joints and various skin complaints, internally they are used as a tea in the treatment of fevers, pneumonia, nausea, intestinal cramps, diarrhoea and mucous discharges[222, 257]. Juice from the wilted leaves is disinfectant and is applied to infected toes[257]. A tea made from the roots is used in the treatment of menstrual disorders and stroke[222]. The pollen is harvested commercially and manufactured into pharmaceutical preparations for the treatment of allergies to the plant[222].

nrakta N. America - British Columbia to Nova Scotia and Florida. Locally established casual in Britain[17]. ksacta Waste places in Western N. America[60]. Found in dry soils, it can become a pernicious weed in cultivated soils[235].

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

nwatta We have very little information on this species but suggest growing it in a sunny position in a well-drained soil. It has been suggested for commercial cultivation[61]. Some plants produce mainly sterile heads[60]. The pollen from the flowers of this species is an important cause of hayfever in N. America[17]. Special Features:North American native, Invasive, Inconspicuous flowers or blooms.

5.2.374 *Aesculus glabra*

Ohio Buckeye, Fetid Buckeye
4 tin 7 cyuc 2 kcaak 0 tcan 1 dwat 20 m hkc
hmmhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikldwis hpa7tmwatli xre7t hjonli

drutta *Aesculus glabra* is a deciduous Tree growing to 20 m (65ft 7in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to July, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The seed is rich in saponins. Although poisonous, saponins are poorly absorbed by the human body and so most pass through without harm. Saponins are quite bitter and can be found in many common foods such as some beans. They can be removed by carefully leaching the seed or flour in running water. Thorough cooking, and perhaps changing the cooking water once, will also normally remove most of them. However, it is not advisable to eat large quantities of food that contain saponins. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K].

kcaakta Edible Parts: SeedEdible Uses: Seed - cooked[222]. It can be dried, ground into a flour and used as a gruel. The seed is quite large, up to 35mm in diameter[82], and is easily harvested[K]. It is quite rich in saponins and needs to be leached of these toxins before it becomes safe to eat - the Indians would do this by slow-roasting the nuts (which would have rendered the saponins harmless) and then cutting them into thin slices, putting them into a cloth bag and rinsing them in a stream for 2 - 5 days. By this time most of the minerals etc would also have been leached out[K].

tcanta Miscellany Soap WoodSaponins in the seed are used as a soap substitute[169]. The saponins can be easily obtained by chopping the seed into small pieces and infusing them in hot water. This water can then be used for washing the body, clothes etc. Its main drawback is a lingering odour of horse chestnuts[K]. Wood - close-grained, light, soft, white, but often bleached by dark lines of decay[82, 229]. It weighs 28lb per cubic foot[235]. It is easy to carve and resists splitting. Ideal to use in making artificial limbs, it is also used for woodenware, pulp etc and is occasionally sawn into lumber[82, 229, 235].

dwatta Antispasmodic MiscellanyMinute doses of the seed are used internally in the treatment of spasmodic coughs, asthma and internal irritations[222]. It is used externally as a tea or an ointment in the treatment of rheumatism and piles[222]. An extract of the bark has been used as an irritant of the cerebro-spinal system[82].

nrakta South-eastern and Central N. America - Pennsylvania to Nebraska, south to Tennessee and Oklahoma. ksacta Usually found in moist sites such as river bottoms and streambank soils, but it is sometimes also found on drier sites though does not grow so well there[229].

propta Seed - best sown outdoors or in a cold frame as soon as it is ripe[11, 80]. The seed germinates almost immediately and must be given protection from severe weather[130]. The seed has a very limited viability and must not be allowed to dry out. Stored seed should be soaked for 24 hours prior to sowing and even after this may still be viable[80, 113]. It is best to sow the seed with its 'scar' downwards[130]. If sowing the seed in a cold frame, pot up the seedlings in early spring and plant them out into their permanent positions in the summer.

nwatta Landscape Uses:Specimen, Street tree. Prefers a deep loamy well-drained soil but is not too fussy[1, 11]. This species is the state tree of Ohio[229]. Its growth-rate is moderate in the wild, with trees living up to 100 years[229]. In Britain, it grows best in eastern and south-eastern areas of England probably needing a continental climate in order to thrive[126, 200]. Although the trees are hardy when dormant, the new growth can be damaged by late spring frosts[11]. The twigs, bark, flowers and leaves all produce a foetid odour if crushed[229]. Most members of this genus transplant easily, even when fairly large[11]. Special Features:Attractive foliage, North American native, Fragrant foliage, All or parts of this plant are poisonous, Blooms are very showy.

pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

5.2.334 *Crataegus jonesiae*

Miss jones' hawthorn
4 tin 8 cyuc 2 kcaak 0 tcan 2 dwat 6 m hkc
hmmhtut cyutli hgattcuphja7n hwicli hrasljutnyikfrip hpa7tli flatprikldwis hpa7tmwatli xre7t hjonli

drutta *Crataegus jonesiae* is a deciduous Tree growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. The seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcaakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. Sweet and mealy in one report[82], juicy according to others[11, 200]. The fruit can be used in making pies, preserves, etc, and can also be dried for later use. The fruit is about 1.5cm in diameter[200]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta North-eastern N. America - Maine. ksacta Rocky shores of sounds and bays[82].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80].

If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Closely related to *C. chrysocarpa* and considered to be no more than a form of that species by some botanists[229]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Hybridizes freely with other members of this genus[200]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

5.2.335 *Trillium erectum*

Beth Root - Indian Balm, Red trillium, Wakerobin, Purple Trillium

4 tin 9 cyuc 2 kcaak 0 tcan 3 dwat 0.4 m hkc
pcimhmmhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikldwis hpa7tmwatli xre7t hjonli

drutta *Trillium erectum* is a PERENNIAL growing to 0.4 m (1ft 4in) by 0.3 m (1ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Can cause nausea in high doses and promote labour and menstruation. Local application can cause irritation. Should not be used during pregnancy [301].

kcaakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked. Used in spring[207], the young unfolding leaves are an excellent addition to the salad bowl, tasting somewhat like sunflower seeds[183]. Leaves can also be cooked as a potherb[183].

dwatta Antiseptic Aphrodisiac Astringent Birthing aid Expectorant Poulitice Tonic Urinary Uterine tonicBeth root was traditionally used by various native North American Indian tribes as a woman's herb to aid childbirth, as a treatment for irregular menstrual periods, period pains and excessive vaginal discharge[254]. Modern research has shown that the root contains steroidal saponins, which have hormonal effects on the body[222, 238]. These saponins are being used in gynaecological and obstetric medicine[238]. This herb should not be taken during pregnancy except under professional supervision[254]. The root is antiseptic, aphrodisiac, astringent, expectorant, tonic, uterine tonic[4, 46, 61, 165, 222, 238]. It is used internally in the treatment of a wide range of women's complaints including haemorrhage from the uterus, urinary tract and lungs, and also to curb excessive menstruation[238]. It has proved to be of value in stopping bleeding after parturition[244]. Externally, it is used to treat excessive vaginal discharge, ulcers (especially varicose), skin complaints, gangrene, insect bites and stings[238, 244]. It is also used as a wash for sore nipples[244]. The root is harvested in late summer, after the leaves have died down, and is dried for later use[213, 238]. The whole plant is used as a poultice for tumours, inflammations and ulcers[222].

nrakta Eastern N. America - Quebec to Ontario and Michigan, south to Tennessee. ksacta Cool, rich, moist, neutral to acidic soils of upland deciduous forests, mixed deciduous-coniferous forests, coniferous swamp borders at elevations of 200 - 700 metres[270].

propta Seed - best sown in a shaded cold frame as soon as it is ripe[134, 200]. Stored seed should be sown in late winter or early spring. Seed usually germinates within 1 - 3 months at 15°C. Another report says that seeds produce a root after the first cold stratification but no shoot is produced until after a second winter[138], whilst yet another report says that the seed can take 3 years to germinate[238]. The seedlings are prone to damp off and must therefore be watered with care and given plenty of fresh air[138]. The young plants need to be overwintered in a cold frame for the first year and can then be planted out in late spring. It is very important that the pots become neither too dry nor too wet[138]. Division with care when the plants die down after flowering[200]. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the following spring.

nwatta Landscape Uses:Border, Ground cover, Woodland garden. Prefers a deep well-drained woodland or humus-rich soil in a somewhat shady position that remains moist in the summer[1, 42]. Prefers a neutral to slightly acid soil[200]. Grows well in open deciduous woodland[1, 90]. Succeeds in a sunny position if the soil does not dry out[42]. Succeeds in deep shade[188]. A very hardy plant, tolerating temperatures down to about -35°C[238]. Plants are long-lived[233]. Any transplanting is best done whilst the plants are in flower[200]. A very variable species[200], it is subject to mutation[90]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233], though slugs are very fond of the leaves[238]. The flowers have an unattractive smell rather like putrefied flesh[42, 207, 245]. The white-flowered form, *blandum*, is almost scentless[245]. Plants can flower in two years from seed[138]. Special Features:Attractive foliage, North American native, Naturalizing, Flowers have an unpleasant odor.

5.2.336 *Quercus imbricaria*

Shingle Oak, Northern Laurel Oak
4 tin 8 cyuc 2 kcaak 0 tcan 2 dwat 20 m hkuc
hmimhtut cyutli tcup hwicli jlutnyik hpa7tli flatprikwlis hpa7tmwatli hjonli

drutta *Quercus imbricaria* is a deciduous Tree growing to 20 m (65ft) by 15 m (49ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to May, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: CoffeeSeed - cooked. It can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed, which is up to 18mm long and wide[82, 229], contains bitter tannins - these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute.

tcanta Repellent Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining

their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. Wood - hard, heavy, rather coarse grained[46, 61, 82, 171, 235]. It weighs 47lb per cubic foot[235]. It is occasionally used in construction and for making furniture, clap boards and shingles[46, 61, 82, 171].

dwatta Antiseptic Astringent Dysentery Emetic Febrifuge TonicAny galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4]. The bark is antiseptic, astringent, emetic, febrifuge and tonic[257]. It has been used in the treatment of chronic dysentery, indigestion, asthma and intermittent fevers[257]. The bark has been chewed in the treatment of mouth sores[257]. An infusion of the bark has been used as a wash for sore and chapped skin[257].

nrakta Eastern and Central N. America - Pennsylvania to Alabama, west to Kansas. ksacta Found in a variety of habitats from dry upland ridges to rich and moist river bank soils[229].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Landscape Uses:Firewood, Specimen, Street tree. Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Lime tolerant[188]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. Prefers warmer summers than are usually experienced in Britain, trees often grow poorly in this country and fail to properly ripen their wood resulting in frost damage overwinter[200]. The tree flowers on new growth produced in spring, the seed taking two summers to ripen[229]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. Closely related to *Q. phellos*[1]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: Attracts birds, North American native, Inconspicuous flowers or blooms.

5.2.337 *Nepeta raphanorrhiza*

4 tin 8 cyuc 2 kcaak 0 tcan 0 dwat 0.5 m hkuc
htut cyutli kyuctup hwicli hrasjlutnyik hpa7tli flatprikli-wisslip hpa7tmwatli xre7t hjonli

drutta *Nepeta raphanorrhiza* is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. The seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: RootEdible Uses: Root - cooked[177]. An almond flavour[105].

nrakta E. Asia - W. Himalayas from Afghanistan to Kashmir. ksacta Locally common on open dry slopes, 1700 - 2000 metres in Kashmir[145].

propta Seed - best sown as soon as it is ripe in a cold frame in the autumn[200]. The germination of spring sown seed can be erratic[200], it is best sown in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle and plant them out into their permanent positions in the summer. If you have sufficient freshly ripe seed then it is well worth trying a sowing outdoors in situ in the autumn. Division in spring or autumn[200]. Very easy, large divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer. Basal cuttings in late spring or early summer. Harvest the shoots with plenty of

5.2.369 *Panicum capillare*

Old Witch Grass, Witchgrass
4 tin 8 cyuc 2 kcaak 0 tcan 1 dwat 0.6 m hkuc
htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikwlis hpa7tmwatli xre7t hjonli

drutta *Panicum capillare* is an ANNUAL growing to 0.6 m (2ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: SeedEdible Uses: Seed - cooked whole or ground into a powder and used as a flour[257]. It is often mixed with corn[1161, 177]. The seed is very small and fiddly to use, it has a mild flavour and can be used like millet[K]. In the wild, the seed stem breaks off when the seed is ripe and then blows away in the wind, scattering the seed[236].

tcanta BroomThe grass can be made into brooms[257].
dwatta EmeticAn infusion of the leaves has been used as an emetic[257]. An infusion of the plant has been used as a reducing aid when dieting[257].

nrakta N. America - Nova Scotia to North Dakota, south to Florida and Texas. An occasional weed in Britain. ksacta Open sandy or stony soil or cultivated land in N. America[43]. An occasional abundant weed of carrot crops in E. Anglia[17].

propta Seed - sow spring in a greenhouse and only just cover the seed. Germination should take place within a week. Prick out the seedlings into trays or individual pots and plant them out after the last expected frosts[200, K].

nwatta Requires a moderately fertile well-drained soil in full sun[200].

5.2.370 *Prinsepia uniflora*

Rui Ren
4 tin 8 cyuc 2 kcaak 0 tcan 0 dwat 1.8 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikwlis hpa7tmwatli xre7t hjonli

drutta *Prinsepia uniflora* is a deciduous Shrub growing to 1.8 m (6ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to May, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[1, 105, 177]. Juicy[183]. The cherry-like fruit is about 15mm in diameter and contains one large seed[200].

nrakta E. Asia - N.W. China. ksacta Loess plateaux, areas intermediate between woodland and steppe. Sunny slopes, ravines in valleys, base of hills at elevations of 800 - 2200 metres[266].

propta Seed - best if given 2 months cold stratification[113]. Sow the seed in autumn if possible, otherwise in late winter or early spring in a cold frame in light shade. Germination may be inhibited by light[113]. Prick out the seedlings when they are large enough to handle into individual pots. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame[113].

nwatta Succeeds in any moderately fertile well-drained soil in full sun or light shade[200]. The plants produce flowers and fruits better when they are growing in full sun[200]. Hardy to about -20°C[184]. This species is closely allied to *P. sinensis*[11, 109]. Flowers are produced very early in the spring and they are then easily damaged by frosts[11]. The flowers are produced on the previous seasons wood[200]. They are produced on old wood according to another report[182]. Plants only fruit in Britain after long hot summers[200].

5.2.371 *Elsholtzia ciliata*

Crested latesummer mint
4 tin 8 cyuc 2 kcaak 0 tcan 2 dwat 0.6 m hkuc
htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikwlis hpa7tmwatli xre7t hjonli

drutta *Elsholtzia ciliata* is an ANNUAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: CondimentYoung leaves - raw or cooked[105, 177]. Finely cut then added to salads or used as a potherb[183]. The leaves can be used as an aromatic condiment for vegetable dishes[183]. The powdered seeds are used as a condiment for flavouring food-stuffs[272].

dwatta Antibacterial Antipyretic Antiviral Astringent Carminative Depurative Diaphoretic Diuretic StomachicThe plant contains an essential oil[283]. It is antibacterial, antipyretic, antiviral, astringent, carminative, diaphoretic, diuretic and stomachic[61, 176, 178, 279]. Its use is said to relieve the effects of excess alcohol[61, 178]. It is used in the treatment of common colds, fevers, headaches, diarrhoea, oedema and oliguria[176, 279]. The plant has a broad-spectrum antibacterial action[176]. It is harvested when in flower and dried for later use[283].

nrakta N. Europe. N. America. N. Asia. ksacta Road-sides, old fields etc in Eastern N. America[43]. Grassy areas in mountains in Korea[279].

propta Seed - sow late spring in situ[200].

nwatta An easily grown plant, it succeeds in most soils. Cultivated for ornament in N. and E. Europe[50].

5.2.372 *Petasites hyperboreus*

Arctic Sweet Coltsfoot
4 tin 8 cyuc 2 kcaak 0 tcan 1 dwat 0.2 m hkuc
pcimhmimhtut cyutli tucphja7n hwicli hrasjlutnyik hpa7tli flatprikwlis hpa7tmwatli yanhjen hjonli

drutta *Petasites hyperboreus* is a PERENNIAL growing to 0.2 m (0ft 8in) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to May, and the seeds ripen from May to June. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: Flowers Leaves StemEdible Uses: SaltYoung leaves - cooked. A felt-like texture[172]. Young stalks and flower heads - cooked[172]. The burnt leaves are used as a salt substitute[172, 177]. The stems and leaves, whilst still green, are rolled up into balls, dried and then placed on top of a very small fire on a rock and burned[207]. A very acceptable condiment for piñole[207].

tcanta Containers StuffingThe cotton-like seed heads have been used as a stuffing material in mattresses etc[257]. The leaves have been used to make temporary cone-shaped containers for picking fruit[257]. The leaves have occasionally been used to form makeshift funnels[257].

dwatta Antispasmodic Pectoral Poultice SalveAntispasmodic, poultice, salve[172]. An infusion of the dried, stored leaves has been used in the treatment of colds, head and chest congestion[257].

nrakta North-western N. America. ksacta Meadows, swampy places and moist woods[60].

propta Seed - we have no information on this species but suggest sowing the seed in a cold frame as soon as it is ripe or in early spring. Only just cover the seed and do not allow the compost to dry out. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division succeeds at almost any time of the year. Very easy, larger divisions can be planted out direct

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

ksakta Edible Parts: Fruit Inner bark Leaves**Edible Uses:** Leaves - raw or cooked[105, 177]. Young fruits - cooked[105, 177]. The fruit is about 15mm long and 10mm wide[200]. Inner bark - cooked. It is usually dried, ground into a powder and then used as a thickening in soups or added to cereal flours when making bread etc[105, 177].

tcanta Fibre WoodA fibre is obtained from the inner bark[189]. The bark is soaked for 7 - 10 days in water, the inner and outer barks are then separated and the inner bark is stripped into strands and made into thread by chewing it. It is made into a coarse fabric[189]. Wood - heavy, difficult to work. Used for axles, hubs etc[46, 61].

dwatta Diuretic Nerve PurgativeThe bark is diuretic, nerve and purgative[218].

nrakta E. Asia - China, Japan, Korea. ksakta Slopes, waterlands near stream and in valleys below 2000 - 2300 metres[266].

propta Seed - if sown in a cold frame as soon as it is ripe, it usually germinates within a few days[200]. Stored seed does not germinate so well and should be sown in early spring[200]. The seed can also be harvested 'green' (when it has fully developed but before it dries on the tree) and sown immediately in a cold frame. It should germinate very quickly and will produce a larger plant by the end of the growing season[80]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Plants should not be allowed to grow for more than two years in a nursery bed since they form a tap root and will then move badly. Layering of suckers or coppiced shoots[200].

nwatta Prefers a fertile soil in full sun[188], but is easily grown in any soil of at least moderate quality so long as it is well drained[1]. This species is resistant to 'Dutch elm disease', a disease that has destroyed the greater part of all the elm trees growing in Britain. The disease is spread by means of beetles. There is no effective cure (1992) for the problem, but most E. Asian, though not Himalayan, species are resistant (though not immune) to the disease so the potential exists to use these resistant species to develop new resistant hybrids with the native species[200]. The various species of this genus hybridize freely with each other and pollen is easily saved, so even those species with different flowering times can be hybridized[200]. Closely related to *U. davidiana*[200], and considered to be no more than a sub-species of that species by some botanists[266].

5.2.367 Cardamine prorepens

4 tlin 8 cyuc 2 kcaak 0 tcan 0 dwat 0.4 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyfxre7t hjonli

drutta Cardamine prorepens is a PERENNIAL growing to 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to August, and the seeds ripen from May to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

ksakta Edible Parts: Leaves**Edible Uses:** Leaves and young plant - cooked[105].

nrakta E. Asia - E. Siberia to Manchuria. ksakta Banks of streams and river beds[74].

propta Seed - sow spring in a cold frame. Germination usually takes place within 1 - 3 weeks at 15°C[175]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in a greenhouse or cold frame for the first two years, planting them out when dormant in late summer. Division in early spring or after the plant dies down in the summer. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold

frame until they are rooting well. Plant them out in the spring.

nwatta We have very little information on this species and do not know if it will be hardy in Britain, though judging by its native range it should succeed outdoors in most parts of this country. The following notes are based on the general needs of the genus. Prefers a moist humus rich soil in shade or semi-shade[200] but succeeds in most soils that are not dry[1].

5.2.368 Hosta crispula

4 tlin 8 cyuc 2 kcaak 0 tcan 0 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Hosta crispula is a PERENNIAL growing to 0.6 m (2ft) by 1 m (3ft 3in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from June to July. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

ksakta Edible Parts: Stem**Edible Uses:** Leaf stems - raw or cooked[K]. Crisp and sweet but rather fibrous and chewy[K].

tcanta A good ground cover plant[197]. Plants should be spaced about 45cm apart each way[208].

nrakta E. Asia - Japan. ksakta Not known in a truly wild situation, it is probably of garden origin[200].

propta Seed - sow spring in a lightly shaded position in a greenhouse and only just cover the seed. Germination usually takes place within 1 - 3 months at 10°C. Make sure you keep the compost moist. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division is possible at almost any time of the year so long as there is sufficient moisture[233]. It is best carried out in March as growth commences or in early autumn if the soil is not too dry[200]. Hostas can be left undivided for many years and should not be divided any more frequently than once every 3 - 5 years to allow the leaves to reach maturity[200].

nwatta Thrives in most fertile soils if they are rich in humus[200]. Grows well in heavy clay soils and in sandy ones[208]. Very limy soils inhibit growth, but plants can thrive in such a situation if plenty of humus is added[208]. Prefers a pH between 6 and 7[200]. Requires a rich soil that does not dry out readily[1]. Succeeds in full sun as well as in deep shade, growing well in the semi-shade of a woodland[200, 233]. In general, the sunnier the position the moister the soil should be[233]. Another report says that the plant should be grown in full shade[251]. Plants are best not grown under trees in town gardens since the soot washed from the leaves of the trees in wet weather will tend to remain on the hosta[208]. Plants flower better when grown in a sunny position but the foliage is better when the plant is in a shady position[200]. Requires some protection from the wind[188, 251]. A very slow-growing plant[251], it is in general fully hardy in Britain, but the young leaves in spring can be destroyed by frost. New leaves are only produced in the spring and very early summer, so any damage at this time has a deep effect on the plant[233]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Plants are very attractive to slugs and snails, the young shoots in spring are especially at risk[111, K]. This plant is not recognised as a species by some authorities, who see it as a garden hybrid H. 'Crispula' [251]. Especially when grown in less than ideal conditions, this species is easily confused with H. 'Thomas Hogg' and H. fortunei 'Albomarginata'[200]. Hybridizes freely with other members of this genus[200]. There are some named forms selected for their ornamental value[200]. This species is prone to virus disease[188, 251].

underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Easily grown in a well-drained soil in a sunny position[200]. Plants are bushier when grown in fertile soils[200]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. A good bee plant[108].

5.2.338 Physalis subglabrata

Longleaf groundcherry

4 tlin 8 cyuc 2 kcaak 0 tcan 0 dwat 1.5 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Physalis subglabrata is a PERENNIAL growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf from May to October, in flower from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Although no specific mention has been seen for this species, it belongs to a genus where many of the members have poisonous leaves and stems, though the full ripe fruits are usually edible[19, 65].

ksakta Edible Parts: Fruit**Edible Uses:** Edible fruit - raw or cooked[85]. The plant conveniently wraps up each fruit in its own 'paper bag' (botanically, the calyx) to protect it from pests and the elements. This calyx is toxic and should not be eaten.

nrakta Eastern N. America - New York to Georgia. ksakta Shores, meadows, fields, roadsides and waste places[43]. Moist to medium dry soil of cultivated land and waste ground[212].

propta Seed - sow March/April in a greenhouse only just covering the seed. Germination usually takes place quickly and freely. Prick out the seedlings into individual pots of fairly rich soil when they are large enough to handle and plant them out after the last expected frosts. Consider giving them some protection such as a cloche until they are growing away well. Diurnal temperature fluctuations assist germination[170]. Division in spring[111]. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer. Basal cuttings in early summer[111]. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta We have very little information on this species and do not know if it will be hardy in Britain, though judging by its native range it should succeed outdoors at least in the milder parts of this country. If it proves to be tender, it should be possible to treat it as an annual, sowing the seed in early spring in a warm greenhouse and planting out after the last expected frosts[K]. There is some confusion over the name of this species, it might be best treated as a sub-species of *P. virginiana*, when it will be *P. virginiana subglabrata*. (MacKenzie, and Bush.)Waterfall. The plant has a deep rootstock[235]. The following notes are based on the general needs of the genus. Succeeds in any well-drained soil in full sun or light shade[200].

5.2.339 Lonicera ciliosa

Orange Honeysuckle

4 tlin 8 cyuc 2 kcaak 0 tcan 2 dwat 10 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Lonicera ciliosa is an evergreen Climber growing to 10 m (32ft 10in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, in flower in June, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is

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

ksakta Edible Parts: Fruit Nectar**Edible Uses:** Fruit - raw or cooked[105, 177, 212]. Not tasty enough to be widely sought[212]. The fruit is about 5mm in diameter[200]. Children enjoy sucking the nectar from the base of the flowers[256, 257].

tcanta Fibre Hair MiscellanyAn infusion of the stems is used as a hair shampoo and tonic to make it grow[99, 257]. A fibre obtained from the stem is used in making mats, bags, blankets etc[99]. The stems were used as building materials by the native North American Indians. They were used with willow withes to reinforce suspension bridges across canyons and rivers. They were also twisted with coyote willow to lash together the framing poles of underground pit houses and to make a pliable ladder[257].

dwatta Contraceptive Epilepsy Miscellany Poulitce TB Women's complaintsThe leaves are contraceptive and tonic[257]. An infusion has been used as a contraceptive and also as a treatment for problems in the womb[257]. A decoction has been used in the treatment of colds and tuberculosis[257]. A poultice of the chewed leaves has been applied to bruises[257]. An infusion of the woody part of the plant has been drunk in small amounts, or used as a bath, in the treatment of epilepsy[257].

nrakta Western N. America - British Columbia to N. Carolina. ksakta Woods and thickets from sea level to moderate elevations[60].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed requires 2 months cold stratification[113] and should be sown as soon as possible in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm with or without a heel, July/August in a frame. Good percentage[78]. Cuttings of mature wood of the current season's growth, 15 - 20cm with or without a heel, November in a cold frame. Good percentage[78]. Layering in autumn[200].

nwatta Prefers a good loamy soil and cool moist conditions at the roots[11, 200]. Succeeds in partial shade[200]. Subject to attacks by aphid, especially in hot dry spells[11]. Climbs by twining around other plants[182].

5.2.340 Malus halliana spontanea

4 tlin 8 cyuc 2 kcaak 0 tcan 0 dwat 4 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Malus halliana spontanea is a deciduous Tree growing to 4 m (13ft 11in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

ksakta Edible Parts: Fruit**Edible Uses:** Fruit - raw or cooked. The fruit is slightly larger than the type species, to 1cm in diameter[200].

nrakta E. Asia - Japan? ksakta Not known in a truly wild situation.

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. It usually germinates in late winter.

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

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade, though it fruits less well in such a situation[200]. This sub-species has slightly larger fruits than the type, they are up to 1 cm in diameter[200]. Hybridizes freely with other members of this genus[200]. The fruit is a good wildlife food source, especially for birds[200]. Plants in this genus are notably susceptible to honey fungus[200].

5.2.341 Ptelea trifoliata

Hop Tree, Common hoptree, Pallid hoptree
4 tin 8 cyuc 2 kcaak 0 tcan 3 dwat 6 m hkuc
hmmhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Ptelea trifoliata* is a deciduous Tree growing to 6 m (19ft) by 6 m (19ft) at a slow rate. See above for USDA hardness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to July, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Carrion flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista This species can cause photosensitization of the skin[274].

kcakta Edible Parts: FruitEdible Uses: CondimentFruit. A very bitter flavour, though it is eaten by young children[161]. The fruit is also used as a hop substitute when making beer and it is added to yeast to make it rise more quickly when making bread[2, 159, 183]. The fruit is produced abundantly in Britain[61], though very little of it is fertile[11]. The fruit is very thin and about 25mm long[200].

tcanta Hedge Hedge Miscellany WoodSometimes used as a hedge plant in N. America[226]. Wood - hard, heavy, close grained[82, 149]. It weighs 51lb per cubic foot[227] but the tree does not grow large enough for commercial exploitation[229].

dwatta Anthelmintic Antibacterial Antiperiodic Antirheumatic Malaria Miscellany Stomachic TonicThe root-bark is anthelmintic, antibacterial, antiperiodic, stomachic and tonic[4, 21, 46, 82, 238]. It has been mixed with other medicines in order to give added potency[213, 222, 257]. It has a soothing influence on the mucous membranes and promotes the appetite, being tolerated when other tonics cannot be retained[4]. It is also taken in the treatment of intermittent fevers such as malaria, heartburn, roundworms, pinworms and poor digestion[238]. Externally it is applied to wounds[238]. The roots are harvested in the autumn, the bark peeled off and dried for later use[238]. The roots are a tonic, used in the treatment of asthmatic breathing, fevers, poor appetite etc[222]. The leaves are said to be useful in the treatment of wounds and also in the destruction of intestinal worms[213, 222].

nrakta Eastern N. America - Quebec and New York to Florida, west to Texas and Kansas. ksacta Moist places, rocky slopes, edges of woods[21], alluvial thickets and gravels[43]. It is found in many different soil types[227].

propta Seed - best sown as soon as it is ripe in a cold frame[200]. Stored seed requires 3 months cold stratification at 5°C and should be sown as early as possible in the year[113]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Very little of the seed produced in Britain is viable[11]. Cuttings of half-ripe wood, July/August in a frame[113]. Layering.

nwatta Succeeds in any fertile well-drained moisture retentive soil in full sun or light part day shade[11, 200]. The young growth in spring can be damaged by late frosts. A very ornamental plant[50], it is slow-growing and short-lived in the wild[229]. The sub-species *P. trifoliata mollis*. Torr. and Gray. is the form that is eaten by children[161]. The leaves are aromatic[188]. All parts of the plant emit a disagreeable odour[227]. The flowers are especially pungent and are pollinated by carrion flies[229]. Plants in this genus are notably resistant to honey fungus[200].

5.2.342 Sanguisorba officinalis

Great Burnet

4 tin 8 cyuc 2 kcaak 2 tcan 3 dwat 1 m hkuc
hmmhtut cyutli kyuctuphja7n hwicli hyhshrasjlutnyik hpa7tli flatprikliwisslp hpa7tmwatli fyfkr7t hjonli

drutta *Sanguisorba officinalis* is a PERENNIAL growing to 1 m (3ft 3in) by 0.6 m (2ft). See above for USDA hardness. It is hardy to UK zone 4 and is not frost tender. It is in flower from June to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry moist or wet soil.

pcista Best avoided during pregnancy in view of the lack of information about toxicity. Suggested that the herb may interact with the group of allopathic medications known as fluoroquinolones [301].

kcakta Edible Parts: LeavesEdible Uses: TeaYoung leaves and flower buds - raw or cooked[13, 61, 105]. They should be harvested in the spring before the plant comes into flower[9]. A cucumber flavour[7, 46], they can be added to salads or used as a potherb[183]. The fresh or dried leaves are used as a tea substitute[183].

tcanta TanninThe roots contain tannin[7].

dwatta Anodyne Antidiarrhoeal Astringent Contraceptive Diuretic Dysentery Eczema Febrifuge Haemostatic Tonic VulneraryGreat burnet is employed mainly for its astringent action, being used to slow or arrest blood flow. It is taken both internally and externally internally and is a safe and effective treatment. Modern research in China has shown that the whole herb heals burns more effectively than the extracted tannins (the astringent component of the plant)[254]. Patients suffering from eczema showed marked improvement when treated with an ointment made from the root and petroleum jelly[254]. The leaves are astringent, refrigerant, styptic and tonic[7, 218, 222]. They are used in the treatment of fevers and bleeding[218, 222]. The plant is prevented from flowering and then the leaves are harvested in July and dried for later use[4, 238]. The root is anodyne, astringent, diuretic, febrifuge, haemostatic, tonic and vulnerary[4, 7, 9, 21, 147, 165, 176, 178, 218]. It is used in the treatment of peptic ulcers, haematuria, menorrhagia, bloody stool, dysentery, diarrhoea, haemorrhoids and burns[176]. The root is harvested in the autumn as the leaves die down and dried for later use[4, 238]. All parts of the plant are astringent, but the root is most active[4]. Great burnet is an excellent internal treatment for all sorts of abnormal discharges including diarrhoea, dysentery and leucorrhoea[4]. It is used externally in the treatment of burns, scalds, sores and skin diseases[238]. This species was ranked 19th in a Chinese survey of 250 potential anti-fertility plants[218].

nrakta Europe, including Britain, from celand south and east to Spain, temperate Asia to Iran, China, Japan ksacta Meadows and wet grassy places by streams[187]. Moist shady sites in grassland, on siliceous soils[7, 13, 17].

propta Seed - sow spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out as soon as they have reached a reasonable size. The seed can also be sown in situ in early spring[4]. Division in the spring or in autumn[4].

nwatta Succeeds in ordinary garden soil[1]. Prefers a good moist soil that does not dry out in the summer, in sun or partial shade[187, 200]. Plants grow tolerably well in very poor soils and likes a dry chalky soil[4]. This species is hardy to about -25°C[187]. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants

male organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[82]. The fruit is about 12mm in diameter and is borne in small clusters[200]. It has a thick, bright red, juicy flesh[82]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - fine-grained, tough, hard and heavy. Used for tool handles etc[82].

dwatta Cardiac HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many Hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta Eastern N. America - Pennsylvania and Delaware. ksacta Hedges and thickets[82].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta Landscape Uses:Border, Espalier, Pollard, Screen, Specimen, Street tree. A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. A very hardy plant, tolerating temperatures down to about -18°C[202]. This species is closely related to *C. crus-galli*[11]. It hybridizes freely with other members of the genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. Special Features:Attracts birds, North American native, Blooms are very showy.

5.2.365 Polygonatum odoratum

Solomon's Seal

4 tin 8 cyuc 2 kcaak 0 tcan 3 dwat 0.9 m hkuc
pcimhmm cyutli kyuctup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyfkr7t hjonli

drutta *Polygonatum odoratum* is a PERENNIAL growing to 0.9 m (3ft) by 0.3 m (1ft in) at a medium rate. See above for USDA hardness. It is hardy to UK zone 4. It is in flower from May to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers dry or moist soil.

pcista The fruits are poisonous[9, 10, 19, 65].

kcakta Edible Parts: Leaves RootEdible Uses: Young shoots - cooked. They can be used as an asparagus substitute[46, 55, 61]. Root - cooked[2, 55, 105, 179]. Rich in starch.

dwatta Antiperiodic Antitussive Cardiotoxic Demulcent Diuretic Hypoglycaemic Miscellany Ophthalmic Resolvent Sedative TonicSolomon's seal has been used for thousands of years in herbal medicine. It is used mainly in the form of a poultice and is believed to prevent excessive bruising and to stimulate tissue repair[254]. The root is antiperiodic, antitussive, cardiotoxic, demulcent, diuretic, energizer, hypoglycaemic, ophthalmic, resolvent, sedative and tonic[7, 9, 21, 147, 174, 176, 178, 218]. It is used in the treatment of, dry throat, dry coughs and coronary heart disease[176]. The plant is only used in domestic medicine[9]. An infusion is used as a diuretic and stimulant to the metabolism, though no more than 3 cups per day should be taken and only over short periods[9]. It can also be applied externally as a poultice to treat bruises, small wounds etc[7, 9]. It has also been used to remove freckles[9, 21, 174, 176, 178]. The root is harvested in the autumn and can be dried for later use[9]. It should not be used internally except under expert supervision[254].

nrakta Europe, including Britain, from Scandanavia south and east to Spain, Siberia, China, Himalayas. ksacta Limestone woods and rocky places[17, 100].

propta Seed - best sown as soon as it is ripe in early autumn in a shady part of a cold greenhouse[200]. Sow stored seed as early in the year as possible. Germination can be slow, they may not come true to type[200] and it takes a few years for them to reach a good size. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a shady position in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in March or October. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Landscape Uses:Container, Massing, Specimen, Woodland garden. Prefers a fertile humus rich moisture retentive well-drained soil in cool shade or semi-shade[200]. Plants are intolerant of heat and drought but tolerate most other conditions[200]. Prefers a dryish soil[10, 19]. Does well in woodlands and copses[1, 19]. Hardy to about -25°C[187]. The rhizomes are long and creeping, the plant forming large colonies[187]. The flowers are sweetly scented[245]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. The young shoots of most members of this genus are very attractive to slugs[K]. Hybridizes with other members of this genus[200]. A number of named forms have been selected for their ornamental value[187]. Special Features:Attractive foliage, Naturalizing, Suitable for cut flowers, Fragrant flowers.

5.2.366 Ulmus japonica

Japanese Elm

4 tin 8 cyuc 2 kcaak 0 tcan 1 dwat 35 m hkuc
hmmhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Ulmus japonica* is a deciduous Tree growing to 35 m (114ft 10in). See above for USDA hardness. It is hardy to UK zone 5 and is not frost tender. It is in flower from March to May, and the seeds ripen from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy)

5.2.362 *Mimulus lewisii*

Great Purple Monkey Flower, Purple monkeyflower
4 tlin 8 cyuc 2 kcaak 0 tcan 1 dwat 0.6 m hku
hmimhtut cyutli tcuphja7nhs6s hwicli hrasjltutnyikfrp
hpa7tli flatprikwiis hpa7tmwatli hjonli

drutta *Mimulus lewisii* is a PERENNIAL growing to 0.6 m (2ft) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August. The flowers are pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can grow in water.

kcakta Edible Parts: LeavesEdible Uses: Leaves and stems - raw or cooked[172].

dwatta PouliticePoulitice[172].

nraakta Western N. America - Alaska to Mexico. ksacta Moist areas, stream edges and wet slopes[172]. In and along streams from moderate to high elevations[60].

propta Seed - sow spring in a greenhouse and only lightly cover the seed[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. If you have sufficient seed it can also be sown in situ in late spring after the last expected frosts[200]. Division in spring[200]. Very easy, large divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer. Cuttings of softwood, 5cm long in spring or summer[200].

nwatta Prefers rather moist places such as damp borders, margins of streams and boggy spots[1]. Grows well in heavy clay soils. Thrives in full sun so long as the soil does not dry out[200], otherwise it is best grown in partial shade[187]. This species tolerates slightly drier conditions than *M. guttatus*, it prefers a rich soil in light woodland[200]. Hardy to at least -20°c[187]. Another report says that plants are only hardy in the milder parts of Britain[233]. There is some confusion over the naming of this plant, the entry on edibility may refer to *M. luteus*, which is closely related to this species.

5.2.363 *Valeriana officinalis*

Valerian, Garden valerian

4 tlin 8 cyuc 2 kcaak 3 tcan 3 dwat 1.5 m hku
htut cyutli tcup hwicli hrasjltutnyik hpa7tli flatprikwiis
hpa7tmwatli xre7t hjonli

drutta *Valeriana officinalis* is a PERENNIAL growing to 1.5 m (5ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista It is said that prolonged medicinal use of this plant can lead to addiction[9]. A course of treatment should not exceed 3 months. Adverse effects can include: headaches (rare), giddiness, nausea, excitability and agitation, heart palpitations (rare), insomnia (rare). Do not take with other sedatives (e.g. alcohol) or before driving (or alertness required) [301].

kcakta Edible Parts: SeedEdible Uses: Condiment TeaSeed[172]. No further details are given but the seeds of other members of this genus are parched and then eaten. An essential oil from the leaves and root is used as a flavouring in ice cream, baked goods, condiments etc[183]. It is especially important in apple flavours[238]. The leaves can also be used as a condiment[61]. The plant is used in moderation as a herbal tea[183].

tcanta Compost Essential Liquid feed RepellentThe plant yields about 1% of an essential oil from the roots[7, 238]. It is used in perfumery to provide a 'mossy' aroma[57, 61, 238], though the scent is considered to be disagreeable by many people[207]. The dried roots are also placed in linen cupboards and clothes drawers in order to scent the clothes[4]. The dried root attracts rats and cats, it can be

used as a bait to lure them away from other areas[100]. An ingredient of 'QR' herbal compost activator[32]. This is a dried and powdered mixture of several herbs that can be added to a compost heap in order to speed up bacterial activity and thus shorten the time needed to make the compost[K]. The plant can also be used to make a very good liquid plant feed[14, 18, 201]. It attracts earthworms[14, 18]. The leaves are very rich in phosphorus[201]. Dynamic accumulator.

dwatta Anticonvulsant Antispasmodic Carminative Diuretic Eczema Hypnotic Nervine Sedative StimulantValerian is a well-known and frequently used medicinal herb that has a long and proven history of efficacy. It is noted especially for its effect as a tranquilliser and nervine, particularly for those people suffering from nervous overstrain[4, 222]. Valerian has been shown to encourage sleep, improve sleep quality and reduce blood pressure[254]. It is also used internally in the treatment of painful menstruation, cramps, hypertension, irritable bowel syndrome etc[238, 254]. It should not be prescribed for patients with liver problems[238]. Externally, it is used to treat eczema, ulcers and minor injuries[238]. The root is antispasmodic, carminative, diuretic, hypnotic, powerfully nervine, sedative and stimulant[4, 7, 9, 14, 21, 46, 147, 165, 192, 218]. The active ingredients are called valepotriates, research has confirmed that these have a calming effect on agitated people, but are also a stimulant in cases of fatigue[222]. The roots of 2 year old plants are harvested in the autumn once the leaves have died down and are used fresh or dried[4, 9, 238]. The fresh root is about 3 times as effective as roots dried at 40° (the report does not specify if this is centigrade or fahrenheit), whilst temperatures above 82° destroy the active principle in the root[240]. Use with caution[21, 238], see the notes above on toxicity.

nraakta Europe, including Britain but excluding the extreme north and south, temperate Asia to Japan. ksacta Grassland, scrub, woods etc, on dry or damp soils[9, 17]. Avoids acid soils.

propta Seed - sow spring in a cold frame and only just cover the seed because it requires light for germination[200]. Prick out the seedlings into individual pots when they are large enough to handle and plant out into their permanent positions in the summer if sufficient growth has been made. If the plants are too small to plant out, grow them on in the greenhouse or frame for their first winter and plant them out early in the following summer. Division in spring. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring.

nwatta A very easily grown plant, it succeeds in ordinary garden soil[1], preferring a rich heavy loam in a moist site[4, 7, 17]. Thrives in full sun or in partial shade[233], doing well in light woodland. A polymorphic species, the more extreme variations are given specific status by some botanists[17]. Valerian is often grown in the herb garden and also sometimes grown commercially as a medicinal herb[1, 200]. When grown for its medicinal root, the plant should not be allowed to flower[4]. The flowers and the dried roots have a strong smell somewhat resembling stale perspiration[245]. Cats are very fond of this plant, particularly the powdered root[1, 4, 20]. Once a cat has discovered a plant they will often destroy it by constantly rolling over it[4].The dried root also attracts rats and can be used as a bait in traps[4, 14]. A good companion for most plants. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fleshy. Thick or swollen - fibrous or tap root [2-1].

5.2.364 *Crataegus canbyi*

Cockspur hawthorn, Dwarf Hawthorn, Cockspur Hawthorn
4 tlin 7 cyuc 2 kcaak 0 tcan 2 dwat 5 m hku
hmimhtut cyutli hgatkuyctcuphja7n hwicli hrasjltutnyikfrp
hpa7tli flatprikwiissip hpa7tmwatli xre7t hjonli

drutta *Crataegus canbyi* is a deciduous Shrub growing to 5 m (16ft) by 6 m (19ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in June, and the seeds ripen in October. The species is hermaphrodite (has both male and fe-

withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

5.2.343 *Vitis cordifolia*

Frost Grape

4 tlin 8 cyuc 2 kcaak 0 tcan 0 dwat 20 m hku
hmimhtut cyutli kyuctcup hwicli hrasjltutnyik hpa7tli flat-
prikwiis hpa7tmwatli xre7t hjonli

drutta *Vitis cordifolia* is a deciduous Climber growing to 20 m (65ft 7in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to June, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: TeaFruit - raw, cooked or dried for winter use[1, 2, 161]. They are said to be unpalatable until they have been touched by frost[1, 11, 43, 182, 200]. A spicy flavour[177]. Quite tasty[219]. The fruit is about 8 - 12mm in diameter[200] and is produced in fairly large bunches[235]. Leaves - cooked[55]. Young leaves are wrapped around other foods and then baked, they impart a pleasant flavour. Young tendrils - raw or cooked[55, 85]. The twigs are a tea substitute[161].

tcanta DyeA yellow dye is obtained from the fresh or dried leaves[168].

nraakta Southern and Eastern N. America - New York to Florida. Locally naturalized in Europe[50]. ksacta River banks, bottom lands and rich thickets[43].

propta Seed - best sown in a cold frame as soon as it is ripe[K]. Six weeks cold stratification improves the germination rate, and so stored seed is best sown in a cold frame as soon as it is obtained. Germination should take place in the first spring, but sometimes takes another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant out in early summer. Cuttings of mature wood of the current seasons growth, December/January in a frame. These cuttings can be of wood 15 - 30cm long or they can be of short sections of the stem about 5cm long with just one bud at the top of the section. In this case a thin, narrow strip of the bark about 3cm long is removed from the bottom half of the side of the stem. This will encourage callusing and the formation of roots. Due to the size of these cuttings they need to be kept in a more protected environment than the longer cuttings. Layering.

nwatta Prefers a deep rich moist well-drained moderately fertile loam[1, 200]. Grows best in a calcareous soil[200], doing well when lime rubble is incorporated into the soil[245]. Succeeds in sun or partial shade though a warm sunny position is required for the fruit to ripen[200]. The young growth in spring can be damaged by late frosts. A very vigorous plant[200], climbing by means of tendrils[182]. It grows particularly well into elm trees[18]. The flowers are sweetly scented[245]. Any pruning should be carried out in winter when the plants are dormant otherwise they bleed profusely[182, 200]. This species is often confused with *V. vulpina*[182]. Plants in this genus are notably susceptible to honey fungus[200].

5.2.344 *Acer carpinifolium*

Hornbeam Maple

4 tlin 7 cyuc 2 kcaak 0 tcan 0 dwat 10 m hku
hmimhtut cyutli tcup hwicli hrasjltutnyikfrp hpa7tli flatprikwi-
is hpa7tmwatli nyanhjen hjonli

drutta *Acer carpinifolium* is a deciduous Shrub growing to 10 m (32ft) by 6 m (19ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in May, and the seeds ripen in October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). . The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: SapEdible Uses: SweetenerThe sap contains a certain amount of sugar and can either be used as a drink, or can be concentrated into a syrup by boiling off the water[105, 177]. The syrup is used as a sweetener on many foods. The concentration of sugar is considerably lower than in the sugar maples (*A. saccharum*). The tree trunk is tapped in the early spring, the sap flowing better on warm sunny days following a frost. The best sap production comes from cold-winter areas with continental climates.

tcanta PreservativeThe leaves are packed around apples, root crops etc to help preserve them[18, 20].

nraakta E. Asia - central and southern Japan ksacta Valleys and ravines in mountains all over Japan[58]. Common in temperate deciduous forests, usually in moist sites along streams at elevations of 200 - 1300 metres[275].

propta Seed - best sown as soon as it is ripe in a cold frame, it usually germinates in the following spring. Pre-soak stored seed for 24 hours and then stratify for 2 - 4 months at 1 - 8°C. It can be slow to germinate. The seed can be harvested 'green' (when it has fully developed but before it has dried and produced any germination inhibitors) and sown immediately. It should germinate in late winter. If the seed is harvested too soon it will produce very weak plants or no plants at all[80, 113]. When large enough to handle, prick the seedlings out into individual pots and grow them on until they are 20cm or more tall before planting them out in their permanent positions. Layering, which takes about 12 months, is successful with most species in this genus. Cuttings of young shoots in June or July. The cuttings should have 2 - 3 pairs of leaves, plus one pair of buds at the base. Remove a very thin slice of bark at the base of the cutting, rooting is improved if a rooting hormone is used. The rooted cuttings must show new growth during the summer before being potted up otherwise they are unlikely to survive the winter. Grafting is impossible for this species because no compatible rootstock has been discovered.

nwatta Of easy cultivation, it prefers a good moist well-drained soil[11], preferring a sunny position but tolerating some shade[11, 200]. Grows well in heavy clay soils. Chlorosis can sometimes develop as a result of iron deficiency when the plants are grown in alkaline soils, but in general maples are not fussy as to soil pH. Most maples are bad companion plants, inhibiting the growth of nearby plants[18, 20]. This species is dioecious, at least one male plant needs to be grown with up to 5 females if seed is required. Special Features:Not North American native, Inconspicuous flowers or blooms.

5.2.345 *Ribes distans*

4 tlin 8 cyuc 2 kcaak 0 tcan 0 dwat 0.6 m hku
hmimhtut cyutli tcup hwicli hrasjltutnyik hpa7tli flatprikwiis
hpa7tmwatli nyanhjen hjonli

drutta *Ribes distans* is a deciduous Shrub growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to June, and the seeds ripen from August to September. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). . The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or

no shade. It prefers moist soil.

kcakta Fruit - raw or cooked[177]. An unpleasant taste[74]. The red fruit is up to 8mm in diameter[266].

nrakta E. Asia - China, Korea, Manchuria. ksacta Mixed forests, in the shade of undergrowth and in the shade of rocks[74]. Forests and thickets in valleys, mountain slopes at elevations of 900 - 2700 metres[266].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. Stored seed requires 4 - 5 months cold stratification at between 0 to 9°C and should be sown as early in the year as possible[113, 164]. Under normal storage conditions the seed can remain viable for 17 years or more. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter, planting them out in late spring of the following year. Cuttings of half-ripe wood, 10 - 15cm with a heel, July/August in a frame[78, 113]. Cuttings of mature wood of the current year's growth, preferably with a heel of the previous year's growth, November to February in a cold frame or sheltered bed outdoors[78, 200].

nwatta Easily grown in a moisture retentive but well-drained loamy soil of at least moderate quality[11, 200]. Plants are quite tolerant of shade though do not fruit so well in such a position[11]. Hardy to about -20°C[200]. This species is closely related to *R. alpinum*[200]. Plants can harbour a stage of 'white pine blister rust', so they should not be grown in the vicinity of pine trees[155]. Plants in this genus are notably susceptible to honey fungus[200]. Dioecious, male and female plants must be grown if fruit and seed is required[200].

5.2.346 Cardamine schinziana

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 0.3 m hkuc
hmimhtut cyutli tcuphja7n hwicli hrsajlutnyik hpa7tli flat-prikliwis hpa7tmwatli fyifxre7t hjonli

drutta Cardamine schinziana is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to August, and the seeds ripen from May to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: LeavesEdible Uses: Leafy stems - raw or cooked[105, 177]. A hot peppery flavour.

nrakta E. Asia - Japan, Korea. ksacta Wet places in N. Japan[58].

propta Seed - sow spring in a cold frame. Germination usually takes place within 1 - 3 weeks at 15°C[175]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in a greenhouse or cold frame for the first two years, planting them out when dormant in late summer. Division in early spring or after the plant dies down in the summer. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta We have very little information on this species and do not know if it will be hardy in Britain, though judging by its native range it should succeed outdoors in most parts of this country. The following notes are based on the general needs of the genus. Prefers a moist humus rich soil in shade or semi-shade[200] but succeeds in most soils that are not dry[1].

5.2.347 Lapsana communis

Nippelwort, Common nippelwort

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 0.9 m hkuc
hmimhtut cyutli tcup hwicli hrsajlutnyik hpa7tli prikliwis hpa7tmwatli fyifxre7t hjonli

drutta Lapsana communis is an ANNUAL growing to 0.9 m (3ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female

organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

kcakta Edible Parts: LeavesEdible Uses: Young leaves and shoots - raw or cooked[2, 5, 17, 100]. They are best harvested before the plant comes into flower[9]. The leaves can be added to salads, cooked like spinach or added to soups and casseroles[9, 183]. They have a bitter or radish-like taste[183].

nrakta Europe, including Britain, from Scandinavia south and east to N. Africa, western and central Asia. ksacta Waste ground, roadsides and walls, avoiding acid soils, in full sun or semi-shade[5, 9].

propta Seed - sow in situ during the spring or as soon as it is ripe and only just cover the seed. Plants usually self sow when they are well-sited.

nwatta A fairly common garden weed, nippelwort will maintain itself in the garden so long as it is given some disturbed soil in which to self-sow. It is a fairly tolerant plant that succeeds in most soils, so long as they are not too acid, and dislikes heavy shade. It was at one time cultivated as a vegetable[17].

5.2.348 Elymus glauca

Blue Wild Rye

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 1 m hkuc
htut cyutli kyuctcup hwicli hyishrsajlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Elymus glauca is a PERENNIAL growing to 1 m (3ft 3in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in August, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: SeedEdible Uses: Seed - cooked[105, 161]. It can be ground into a flour and used to make bread. Very fiddly to use, the seed is small and difficult to extract[K].

tcanta Soil stabilization WeavingThe leaves are used for making mats, rope, paper etc. Often planted near the coast to stabilize sand dunes.

nrakta N. America - Ontario and Michigan to British Columbia, south to Colorado and California. ksacta Moist or dry open thickets and shores[43].

propta Seed - sow mid spring in situ and only just cover the seed[162]. Germination should take place within 2 weeks. If the supply of seed is limited, it can also be sown in mid spring in a cold frame. Only just cover the seed. When large enough to handle, prick the seedlings out into individual pots and plant them out in summer[K] Division in spring or summer[162]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta An easily grown plant, it succeeds in most soils, preferring a sandy soil and a sunny position[1, 162].

5.2.349 Pycnanthemum virginianum

Virginia Mountain Mint

4 tlin 8 cyuc 2 kcak 0 tcan 2 dwat 1 m hkuc
hmimhtut cyutli kyuctcup hwicli hrsajlutnyik hpa7tli flat-prikliwis hpa7tmwatli xre7t hjonli

drutta Pycnanthemum virginianum is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in

following year Cuttings of half-ripe wood, 10 - 15cm with a heel, July/August in a frame[78, 113]. Cuttings of mature wood of the current year's growth, preferably with a heel of the previous year's growth, November to February in a cold frame or sheltered bed outdoors[78, 200].

nwatta Easily grown in a moisture retentive but well-drained loamy soil of at least moderate quality[11, 200]. Requires a sunny position[11]. Hardy to about -20°C[200]. A very ornamental and free-flowering plant[1]. Often cultivated for its edible fruit in N. America[62]. It is disease-resistant and is being used in modern blackcurrant breeding programmes[119]. Plants can harbour a stage of 'white pine blister rust', so they should not be grown in the vicinity of pine trees[155]. Plants in this genus are notably susceptible to honey fungus[200]. Related to *R. viscosissimum*[182].

5.2.360 Orchis morio

Green-Winged Orchid, Green-winged orchid

4 tlin 8 cyuc 2 kcak 0 tcan 2 dwat m hkuc
htut cyutli kyuctcup hwicli hrsajlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Orchis morio is a BULB growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf from April to August, in flower from May to June, and the seeds ripen in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: RootEdible Uses: DrinkRoot - cooked[2, 4, 46]. This species is a major source of 'salep', a fine white to yellowish-white powder that is obtained by drying the tuber and grinding it into a powder[2, 105, 177]. Salep is a starch-like substance with a sweetish taste and a faint somewhat unpleasant smell[4]. It is said to be very nutritious and is made into a drink or can be added to cereals and used in making bread etc[100, 183]. One ounce of salep is said to be enough to sustain a person for a day[100, 115].

dwatta Demulcent NutritiveSalep (see above for more details) is very nutritive and demulcent[4]. It has been used as a diet of special value for children and convalescents, being boiled with water, flavoured and prepared in the same way as arrowroot[4]. Rich in mucilage, it forms a soothing and demulcent jelly that is used in the treatment of irritations of the gastro-intestinal canal[4]. One part of salep to fifty parts of water is sufficient to make a jelly[4]. The tuber, from which salep is prepared, should be harvested as the plant dies down after flowering and setting seed[4].

nrakta Europe, including Britain, from Scandinavia south and east to Spain, Siberia, Caucasus and Siberia. ksacta Wet meadows, especially on chalk[13, 17, 230].

propta Seed - surface sow, preferably as soon as it is ripe, in the greenhouse and do not allow the compost to dry out. The seed of this species is extremely simple, it has a minute embryo surrounded by a single layer of protective cells. It contains very little food reserves and depends upon a symbiotic relationship with a species of soil-dwelling fungus. The fungal hyphae invade the seed and enter the cells of the embryo. The orchid soon begins to digest the fungal tissue and this acts as a food supply for the plant until it is able to obtain nutrients from decaying material in the soil[200]. It is best to use some of the soil that is growing around established plants in order to introduce the fungus, or to sow the seed around a plant of the same species and allow the seedlings to grow on until they are large enough to move. Division of the tubers as the flowers fade[230]. This species produces a new tuber towards the end of its growing season. If this is removed from the plant as its flowers are fading, the shock to the plant can stimulate new tubers to be formed. The tuber should be treated as being dormant, whilst the remaining plant should be encouraged to continue in growth in order to give it time to produce new tubers[230]. Division can also be carried out when the plant has a fully developed rosette of leaves but before it comes into flower[230]. The entire new growth is removed from the old tuber from which it has arisen and is potted up, the cut being made towards the bottom of the stem but leaving one or two roots

still attached to the old tuber. This can often be done without digging up the plant. The old tuber should develop one or two new growths, whilst the new rosette should continue in growth and flower normally[230].

nwatta Prefers a sunny position and a good loamy soil[42]. Requires a deep rich soil[1]. Grows well in a sunny dry border or on a scree[230]. Orchids are, in general, shallow-rooting plants of well-drained low-fertility soils. Their symbiotic relationship with a fungus in the soil allows them to obtain sufficient nutrients and be able to compete successfully with other plants. They are very sensitive to the addition of fertilizers or fungicides since these can harm the symbiotic fungus and thus kill the orchid[230]. This symbiotic relationship makes them very difficult to cultivate, though they will sometimes appear uninvited in a garden and will then thrive. Transplanting can damage the relationship and plants might also thrive for a few years and then disappear, suggesting that they might be short-lived perennials[230]. Plants seem to be immune to the predations of rabbits[230]. The flowers have a powerful scent that is not particularly pleasant[245]. Those forms with lighter coloured flowers have a more pleasant scent[245]. Cultivated plants are very susceptible to the predation of slugs and snails[230]. Plants can occasionally appear in lawns where they will increase freely if allowed to set seed[230]. The lawn should not be mown early in the year before or immediately after flowering[200]. If you want to try establishing plants in a lawn then plant out the bulbs whilst the plant is dormant, preferably in the autumn[200]. Bulbs can also be transplanted with a large ball of soil around the roots when they are in leaf, they are impatient of root disturbance[1].

5.2.361 Taraxacum albidum

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 0.4 m hkuc
hmimhtut cyutli tcup hwicli hrsajlutnyik hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta Taraxacum albidum is a PERENNIAL growing to 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from March to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Coffee TeaLeaves - raw or cooked[177, 183]. A rather bitter flavour, though it is a good tonic for the digestive system. Root - cooked[183]. Flowers - raw or cooked[183]. The unopened flower buds can be used in fritters[183]. The whole plant is dried and used as a tea[177, 183]. The root is dried and roasted to make a coffee substitute. A pleasant tea is made from the flowers. The leaves and the roots can also be used to make tea.

nrakta E. Asia - C. and S. Japan, Korea. ksacta Sunny ruderal habitats such as roadsides and cultivated fields at elevations below 500 metres[275].

propta Seed - sow spring in a cold frame and either surface-sow or only just cover the seed. Make sure the compost does not dry out. Germination should take place within 2 weeks. Prick out the seedlings into individual pots when they are large enough to handle, choosing relatively deep pots to accommodate the tap root. Plant them out in early summer. Division in early spring as the plant comes into growth.

nwatta Prefers a well-drained humus-rich soil in full sun or light shade. Isozyme analysis suggests that this species is uniclonal and of unique hybrid origin between *T. japonicum* and an unknown tetraploid species[275]. Many species in this genus produce their seed apomictically. This is an asexual method of seed production where each seed is genetically identical to the parent plant. Occasionally seed is produced sexually, the resulting seedlings are somewhat different to the parent plants and if these plants are sufficiently distinct from the parents and then produce apomictic seedlings these seedlings are, in theory at least, a new species.

in hot water and skimming off the wax as it rises to the surface. The wax can be used to make aromatic candles[85]. The bark is employed as a tinder and is also made into a slow match[216, 257]. The crushed bark was twisted into a rope, tied at intervals with yucca (Yucca species), and wrapped into a coil. The free end was set on fire and kept smouldering by blowing on it at intervals. Fire could be carried in this fashion for several hours[257]. The bark has been used as a thatching on the roofs of buildings[257]. The dried seeds have been used as beads or as the 'rattle' in rattles[216]. An infusion of the plant has been used as a hair wash[257]. The plant has been burnt as an incense and fumigant in the home[257]. Wood - soft, close-grained, slightly fragrant[82]. It is used occasionally for fuel, fencing etc[82, 229].

dwatta Analgesic Antiseptic Blood tonic Diuretic Kidney Laxative Odontalgic Poultice SalveDesert juniper was widely employed medicinally by a number of native North American Indian tribes who used it to treat a variety of complaints, especially those connected to the bladder and kidneys and to the skin[257]. It is little, if at all, used in modern herbalism. The leaves are antiseptic, blood tonic and laxative[216, 257]. A decoction is used in the treatment of constipation[216]. A poultice of the leaves has been applied to the jaw to treat toothaches and sore and swollen gums[257]. A decoction of the young twigs has been used in the treatment of stomach aches, kidney complaints, haemorrhages, coughs and colds[257]. Fumes from the burning twigs have been inhaled in the treatment of headaches and colds[257]. The branches have been used in a sweat bath to treat rheumatism[257]. A strong decoction has been used as an antiseptic wash on sores[257]. A poultice of the mashed twigs has been used as a dressing on burns and swellings[257]. The seeds are analgesic[257]. They have been eaten in the treatment of headaches[257]. The fruits are analgesic, blood tonic and diuretic[257]. A decoction has been used to relieve the pain of menstrual cramps, to induce urination and to treat kidney complaints, fevers, coughs and colds[257]. Externally, a decoction has been used as a poultice on rheumatic joints[257].

nrakta South-western N. America - California to New Mexico and Wyoming. ksacta Thin, dry rocky or gravelly soils[229] on mountain slopes and high plains in desert regions between the Rocky mountains and the Sierra Nevada[62].

propta The seed requires a period of cold stratification. The seed has a hard seedcoat and can be very slow to germinate, requiring a cold period followed by a warm period and then another cold spell, each of 2 - 3 months duration[78, 81]. Soaking the seed for 3 - 6 seconds in boiling water may speed up the germination process[11]. The seed is best sown as soon as it is ripe in a cold frame. Some might germinate in the following spring, though most will take another year. Another possibility is to harvest the seed 'green' (when the embryo has fully formed but before the seedcoat has hardened). The seedlings can be potted up into individual pots when they are large enough to handle. Grow on in pots until large enough, then plant out in early summer. When stored dry, the seed can remain viable for several years[1]. Cuttings of mature wood, 5 - 10cm with a heel, September/October in a cold frame. Plant out in the following autumn[1, 78]. Layering in September/October. Takes 12 months[78].

nwatta Succeeds in most soils if they are well drained, preferring a neutral or slightly alkaline soil[1, 11]. Thrives in calcareous soils[1]. A drought tolerant plant once established, succeeding in hot dry positions[200]. A slow-growing but long-lived tree, specimens several centuries old have been recorded[229]. It grows better in dry areas with hot summers, western Britain is generally to cool and wet for this species to thrive[200]. Good crops of fruit are produced in alternate years in the wild[229]. Closely related to J. californica[1, 82]. This species is resistant to honey fungus[88]. The seed takes 2 years to mature[200]. Plants are usually dioecious, though occasional trees with both male and female flowers are sometimes found[229]. Male and female plants must usually be grown if seed is required. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is flat with shallow roots spreading near the soil surface [2-1].

5.2.358 Pyrus salicifolia

Willow-Leaved Pear

4 tlin 8 cyuc 2 kcaak 0 tcan 0 dwat 7.5 m hkuc hmimhtut cyutli hgatyuctup hwicli hrasjlutnyikfrip hpa7tli flatprikkwis hpa7tmwathi xre7t hjonli

drutta Pyrus salicifolia is a deciduous Tree growing to 7.5 m (24ft) by 4 m (13ft). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in April, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. It can tolerate atmospheric pollution.

kcakta Edible Parts: Fruit OilEdible Uses: OilFruit - raw or cooked[2, 177]. The fruit is about 2 - 3cm long[200]. Harsh and of no value[11]. The fruit is nice when it has been bletted[74].

tcanta Oil Soil stabilizationPlants have extensive root systems and can be used for binding sands[74].

nrakta S.E. Europe to W. Asia. ksacta Dry stony sites, forest edges etc[74].

propta Seed - best sown in a cold frame as soon as it is ripe in the autumn, it will then usually germinate in mid to late winter. Stored seed requires 8 - 10 weeks cold stratification at 1°C and should be sown as early in the year as possible[200]. Temperatures over 15 - 20°C induce a secondary dormancy in the seed[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for their first year. Plant them out in late spring or early summer of the following year.

nwatta Prefers a good well-drained loam in full sun[200]. Grows well in heavy clay soils. Tolerates light shade but does not fruit so well in such a position. Tolerates atmospheric pollution, excessive moisture and a range of soil types if they are moderately fertile[200]. Established plants are drought tolerant[200]. The dormant plant is very frost resistant[74]. A very ornamental plant[1].

5.2.359 Ribes cereum

Wax Currant

4 tlin 8 cyuc 2 kcaak 0 tcan 1 dwat 1.8 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatprikkwis hpa7tmwathi xre7t hjonli

drutta Ribes cereum is a deciduous Shrub growing to 1.8 m (6ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in April, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: Flowers Fruit LeavesEdible Uses: Fruit - raw or cooked[62, 101, 161, 183]. Not very nice, large quantities can cause nausea[85]. Reports on the quality of the fruit range from insipid and rubbery to highly esteemed as an article of diet[257]. The fruit can also be used to make pemmican, jellies, jams, sauces and pies[183]. Fruits can also be dried for later use[85]. Young leaves[183]. No more details are given. Flowers - raw[183]. A sweet flavour[85].

dwatta Astrigent Emetic OphthalmicAn infusion of the inner bark has been used as a wash for sore eyes[257]. The fruit has been eaten in quantity as an emetic[257]. It has also been used to treat diarrhoea[257].

nrakta Western N. America. ksacta Canyons, dry ravines, hillsides, prairies and open woodland[62].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. Stored seed requires 4 - 5 months cold stratification at between -2 to 0°C and should be sown as early in the year as possible[113, 164]. Under normal storage conditions the seed can remain viable for 17 years or more. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter, planting them out in late spring of the

semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Edible Uses: Condiment TeaFlower buds and leaves - raw or cooked. A mint-like flavour, they make a nice addition to salads or can be used as a condiment[61, 161, 183, 238]. The fresh or dried leaves are brewed into a refreshing mint-like tea[183].

dwatta Alterative Analgesic Carminative Diaphoretic FebrifugeA tea made from the leaves is alterative, diaphoretic and carminative[22, 257]. A poultice of the leaves is used in the treatment of headaches[222]. The tea is also used in the treatment of menstrual disorders, indigestion, colic, coughs, colds, chills and fevers[222, 238, 257].The flowering stems are cut as flowering begins and they can be used fresh or dried[238]. There is a suggestion that this plant can cause abortions, so it is best not used by pregnant women[257].

nrakta Eastern N. America - Virginia to New England, north to North Dakota. ksacta Gravelly shores, meadows, dry to wet thickets etc[43].

propta Seed - sow spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. If there are sufficient seeds they can be sown in an outdoor seedbed in April. Division in spring.

nwatta Succeeds in most soils[1] but prefers a rich loamy soil in full sun or partial shade with plenty of moisture in the growing season[200]. Plants are hardy to at least -15°C[238]. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

5.2.350 Tradescantia virginiana

Spiderwort, Virginia spiderwort

4 tlin 9 cyuc 2 kcaak 0 tcan 1 dwat 0.4 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatprikkwis hpa7tmwathi dyatxre7t hjonli

drutta Tradescantia virginiana is a PERENNIAL growing to 0.4 m (1ft 4in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from June to October, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Flowers LeavesEdible Uses: Leaves - raw or cooked[61, 103, 105, 213, 257]. The very young shoots and leaves can be chopped and added to salads or cooked as a potherb[183]. Flowers - raw. They make an attractive edible garnish[183].

dwatta Kidney Laxative Poultice Women's complaints-The roots are laxative[222]. They are also used as a tea in the treatment of kidney and stomach ailments and women's complaints[222, 257]. A poultice of the leaves is applied to stings, insect bites and cancers[222, 257].

nrakta Eastern N. America - Connecticut to Wisconsin, south to Georgia and Tennessee. ksacta Woods, scrub, meadows and roadsides[43, 187].

propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Divi-

sion in spring or autumn[111]. Cuttings of young shoots, July in a frame. They root easily and quickly.

nwatta Landscape Uses:Border, Container, Ground cover, Woodland garden. An easily grown plant[233], it thrives in any good rather moist soil[1, 111]. Succeeds in dry soils[188]. Succeeds in dappled woodland shade[88, 111] or in full sun[111]. Hybridizes freely with other members of this genus[1]. Plants often self-sow in British gardens[1]. A very variable species, there are a number of named forms selected for their ornamental value[1]. Plants in this genus seem to be immune to the predations of rabbits[233]. Plants are self-sterile, at least two genetically distinct plants (and not divisions from the same plant) must be grown if seed is required. Special Features: Attractive foliage, North American native, Naturalizing, Wetlands plant, Suitable for cut flowers, Extended bloom season in Zones 9A and above, Attractive flowers or blooms. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2].

5.2.351 Chenopodium vulvaria

Stinking Goosefoot. Arrach - Wormseed

4 tlin 8 cyuc 2 kcaak 0 tcan 1 dwat 0.3 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikkwishsom hpa7tmwathi xre7t hjonli

drutta Chenopodium vulvaria is a ANNUAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in saline soils. It cannot grow in the shade. It prefers moist soil.

pcista The leaves and seeds of all members of this genus are more or less edible. However, many of the species in this genus contain saponins, though usually in quantities too small to do any harm. Although toxic, saponins are poorly absorbed by the body and most pass straight through without any problem. They are also broken down to a large extent in the cooking process. Saponins are found in many foods, such as some beans. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K]. The plants also contain some oxalic acid, which in large quantities can lock up some of the nutrients in the food. However, even considering this, they are very nutritious vegetables in reasonable quantities. Cooking the plants will reduce their content of oxalic acid. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Edible Parts: Leaves SeedEdible Uses: Leaves and flower buds - cooked and used like spinach. The raw leaves should only be eaten in small quantities, see the notes above on toxicity. Although edible, the smell of the leaves would discourage most people from using this plant[K]. Seed - cooked. Ground into a powder, mixed with wheat or other cereals and used in making bread etc. The seed is small and fiddly, it should be soaked in water overnight and thoroughly rinsed before it is used in order to remove any saponins.

tcanta DyeGold/green dyes can be obtained from the whole plant[168].

dwatta Antispasmodic Eczema Emmenagogue Women's complaintsThe whole plant is antispasmodic and emmenagogue[4]. Used to expel worms from the bowel. [301] Also used for the fungal infections and as a cardiac stimulant. Form of treatment for acute gout [301]. An infusion of the dried leaves is used in the treatment of hysteria and nervous troubles connected with women's ailments[4]. In chinese medicine wormseed oil is used for rheumatism, eczema and bites [301].

nrakta Europe, including Britain, from Scandinavia south and east to N. Africa and S.W. Asia. ksacta Landward edges of salt marshes and shingle beaches, inland in waste areas[17].

propta Seed - sow spring in situ. Most of the seed usually germinates within a few days of sowing.

nwatta An easily grown plant, succeeding in most soils but disliking shade[1, 200]. It prefers a moderately fertile soil[200]. The plant contains trimethylamine, and when touched it gives off the nauseous odour of stale salt fish[4, 17].

5.2.352 Chrysosplenium oppositifolium

Golden Saxifrage
4 tin 8 cyuc 2 kcaak 0 tcan 0 dwat 0.2 m hkuc
hmimhtut cyuti tcuphja7n hwicli hrasljutnyik hpa7tli frusflatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Chrysosplenium oppositifolium is a PERENNIAL growing to 0.2 m (0ft 8in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies, beetles. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked[2, 5, 8, 17, 52, 61, 66]. Added to salads or soups[183]. The leaves are rather small, and there is a distinct bitterness in the flavour, especially in hot weather[K].

tcanta The plants creeping habit makes it a good ground cover for the bog garden[200].

nrakta Western and central Europe, including Britain, from Norway to Spain, east to Germany and N. Italy. ksacta Acid soils[200] on the banks of springs and wet shady mountainsides[5, 17, 52].

propta Seed - sow spring or autumn in a lightly shaded position in a cold frame. Stand the pot in 2cm of water. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a tray of water in the cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in light shade in a cold frame until they are rooting well. Plant them out in the summer or following spring.

nwatta Succeeds in most soils if they are moist. Requires a constantly wet but well-drained soil[200]. Prefers a shady position, succeeding in woodland[17, 200].

5.2.353 Crataegus crus

Cockspur Thorn, Cockspur hawthorn, Dwarf Hawthorn
4 tin 7 cyuc 2 kcaak 0 tcan 2 dwat 10 m hkuc
hmimhtut cyuti hgatkycuctuphja7n hwicli hrasljutnyikfrp hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Crataegus crus-galli is a deciduous Shrub growing to 10 m (32ft) by 10 m (32ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in June, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[62, 101, 105]. A dry flesh, it is used in jellies[43]. The fruit is about 1cm in diameter and is borne in small clusters[200]. It often persists on the tree until spring[200]. This suggests that it does not make very good eating[K]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Hedge Hedge WoodVery amenable to trimming, the plant can even be cut right back into very old wood and will resprout freely. It is often used as a hedge[82]. Wood - fine-grained, hard and heavy. Used for tool handles etc[46, 61, 227].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta Eastern N. America - Quebec to Georgia, west to Louisiana. Locally naturalized in Europe[50]. ksacta Thickets and open ground, especially in dry or rocky places[43]. Usually found on the slopes of low hills in rich soils[82].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta Landscape Uses:Border, Espalier, Pollard, Screen, Specimen, Street tree. A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. A very hardy plant, tolerating temperatures down to about -18°C[202]. A very ornamental plant[1, 11]. There are many named forms, selected for their ornamental value[200]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like their decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. This plant is often confused in cultivation with *C. prunifolia*. 'Splendens'[11]. Special Features:Attracts birds, North American native, Blooms are very showy.

5.2.354 Quercus pubescens

Downy Oak
4 tin 8 cyuc 2 kcaak 0 tcan 2 dwat 20 m hkuc
hmimhtut cyuti kyuctcup hwicli jlitnyikfrp hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Quercus pubescens is a deciduous Tree growing to 20 m (65ft 7in). See above for USDA hardiness. It is hardy to UK zone 5. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: Seed - cooked. A famine food, used when all else fails[177]. The seed is up

to 2cm long[200], it can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed contains bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute.

tcanta Repellent Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. Wood - hard, durable even under water, not very elastic. Used for furniture etc[46, 61].

dwatta Astringent DysenteryAny galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta Europe. ksacta Woods and dry hills[100] in both siliceous and limestone soils[11].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Prefers a good deep fertile loam which can be on the stiff side[11]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted. The seed ripens in its first year. Closely related to *Q. petraea*[11]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200].

5.2.355 Malus toringo

Toringo crab
4 tin 8 cyuc 2 kcaak 0 tcan 0 dwat 3 m hkuc
hmimhtut cyuti tcup hwicli hrasljutnyikfrp hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Malus toringo is a deciduous Tree growing to 3 m (9ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in April. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. It is best after a frost, the cold helping to produce more sugars in the fruit[2, 105]. Up to 2cm in diameter[200]. nrakta E. Asia - Japan. ksacta Mountains[58].

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

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[200]. This species is closely related to *M. floribunda*[11]. It hybridizes freely with other members of the genus[200]. The fruit is a good wildlife food source, especially for birds[200]. Plants in this genus are notably susceptible to honey fungus[200].

5.2.356 Cardamine impatiens

Narrowleaf bittercress
4 tin 8 cyuc 2 kcaak 0 tcan 1 dwat 0.6 m hkuc
hmimhtut cyuti tcuphja7n hwicli hrasljutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Cardamine impatiens is a ANNUAL/BIENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to August, and the seeds ripen from May to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves and young shoots - raw or cooked[105, 177]. Used as a vegetable[272].

dwatta Antirheumatic Diuretic StimulantThe plants is antirheumatic, diuretic and stimulant[145, 240].

nrakta Europe, including Britain, from Sweden to C. Spain, eastwards through Asia to Japan. ksacta Very local in shady woods, especially ash, and on moist limestone rocks and cliffs, especially in the west[17].

propta Seed - sow spring or autumn in situ. nwatta Succeeds in most soils[1]. Prefers a moist humus rich soil in shade or semi-shade[200].

5.2.357 Juniperus osteosperma

Desert Juniper, Utah juniper
4 tin 8 cyuc 2 kcaak 3 tcan 2 dwat 12 m hkuc
htut cyuti hgatkycuctup hwicli hrasljutnyik hpa7tli flatpriklwisslip hpa7tmwatli nyanhjen hjonli

drutta Juniperus osteosperma is an evergreen Tree growing to 12 m (39ft 4in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, and the seeds ripen in October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[46, 82, 95]. A thin flesh, it is sweet but strongly flavoured of resin and has a mealy texture[82, 85, 229]. Used as a flavouring in stews[216, 257]. The fruit can be eaten fresh or it can be dried and ground into a powder then baked into cakes[61, 82, 183]. The cones are about 6 - 18mm in diameter, they take 2 years to mature[200].

tcanta Beads Fuel Hair Incense Thatching Tinder Wax WoodA wax on the fruit is obtained by simmering the fruit

nrakta E. Asia - Japan, Korea, Manchuria. ksacta Sunny grassy places and thickets in lowland and hills of C. and S. Japan[58].

propta Seed - sow spring in a cold frame in a free draining compost and only just cover. The seed usually germinates in 1 - 3 months at 15°c[138]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in early spring whilst dormant[200].

nwatta Easily grown in ordinary garden soil in a sunny position, but plants are apt to become invasive[1, 200]. Nearly all taxa in *Calystegia* intergrade geographically into neighboring taxa with the exception of the widespread coastal species, *C. soldanella* (Linnaeus) R. Brown. It is impossible to draw clearly defined specific limits, and intermediate forms are always found where two taxa approximate geographically[266].

5.2.475 *Avena barbata*

Slender Oat

4 tlin 8 cyuc 2 kcaak 2 tcan 0 dwat m hkuc hmimhtut cyutli hgatkuyctcup hwicli hyhshrasjltunykfrrip hpa7tli flatprikwlis hpa7tmwatli xre7t hjonli

drutta *Avena barbata* is an ANNUAL at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to July, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: SeedEdible Uses: CoffeeSeed - cooked[57]. Rather small[257]. The seed ripens in the latter half of summer and, when harvested and dried, can store for several years. It has a floury texture and a mild, somewhat creamy flavour. It can be used as a staple food crop in either savoury or sweet dishes. The seed can be cooked whole, though it is more commonly ground into a flour and used as a cereal in all the ways that oats are used, especially as a porridge but also to make biscuits, sourdough bread etc. The seed can also be sprouted and eaten raw or cooked in salads, stews etc. The roasted seed is a coffee substitute.

tcanta Fibre Mulch Paper ThatchingThe straw has a wide range of uses such as for bio-mass, fibre, mulch, paper-making and thatching[171]. Some caution is advised in its use as a mulch since oat straw can infest strawberries with stem and bulb eelworm.

nrakta Europe to Asia. ksacta Dry wasteland, cultivated ground and meadows, especially on heavier soils[74, 200].

propta Seed - sow in situ in early spring or in the autumn. Only just cover the seed. Germination should take place within 2 weeks.

nwatta Succeeds in any moderately fertile soil in full sun[200]. A triploid species, it is rarely cultivated for its edible seed[57]. Oats are in general easily grown plants but, especially when grown on a small scale, the seed is often completely eaten out by birds. Some sort of netting seems to be the best answer on a garden scale.

5.2.476 *Hemerocallis forrestii*

4 tlin 8 cyuc 2 kcaak 0 tcan 1 dwat 0.4 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjltunykfrrip hpa7tli flatprikwlis hpa7tmwatli xre7t hjonli

drutta *Hemerocallis forrestii* is an evergreen Perennial growing to 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf all year. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pista Large quantities of the leaves are said to be hallucinogenic. Blanching the leaves removes this hallucinatory component[205]. (This report does not make clear what it means by blanching, it could be excluding light from the growing shoots or immersing in boiling water[K].)

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Leaves and young shoots - cooked. They must be consumed when very young or else they become fibrous[K]. Flowers and flower buds - raw or cooked. Root - raw or cooked. The roots are swollen and conspicuously enlarged at each end[200]. The roots are slightly fleshy, with a large, globose, swollen, tuberous part near the tip[266].

tcanta WeavingThe tough dried foliage is plaited into cord and used for making footwear[205].

dwatta Antidote DiureticThe juice of the roots is an effective antidote in cases of arsenic poisoning[205]. A tea made from the boiled roots is used as a diuretic[205].

nrakta E. Asia - W. China in Yunnan Province. ksacta Dry ridges and rocky banks around 250 metres[205]. Forests, grassy slopes and limestone cliffs at elevations of 2300 - 3200 metres in SW Sichuan and NW Yunnan[266].

propta Seed - sow in the middle of spring in a greenhouse. Germination is usually fairly rapid and good. Prick out the seedlings into individual pots when they are large enough to handle. Grow the plants on for their first winter in a greenhouse and plant out in late spring[K]. Division in spring or after flowering in late summer or autumn[200]. Division is very quick and easy, succeeding at almost any time of the year[K]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Succeeds in most soils[1], including dry ones, preferring a rich moist soil[205]. Grows well in heavy clay soils. Succeeding in sun or shade, it produces more flowers in a sunny position though these flowers can be shorter-lived in very sunny positions[205]. Succeeds in short grass if the soil is moist[1]. Prefers a pH between 6 and 7[200]. Some reports say that this species is not hardy in Britain[205], whilst another says that it is hardy to zone 5 (tolerating quite heavy frosts[200]). There is a plant at Kew Botanical Gardens that bears this name and appears to be fully hardy, growing near the base of a west-facing brick wall[K]. It is possible that the plant is actually a hybrid *H. forrestii* x *H. middendorffii*[205]. Hybridizes freely with other members of this genus[200]. Individual flowers are very short-lived, usually withering within 24 hours of opening. The plants produce a succession of blooms over a period of a month or more[205]. Plants take a year or two to become established after being moved[1]. Plants seem to be immune to the predations of rabbits[233]. The plants are very susceptible to slug and snail damage, the young growth in spring is especially at risk[200].

5.2.477 *Crataegus uniflora*

Dwarf hawthorn

4 tlin 8 cyuc 2 kcaak 0 tcan 2 dwat 3 m hkuc hmimhtut cyutli hgattcuphja7n hwicli hrasjltunykfrrip hpa7tli flatprikwlis hpa7tmwatli xre7t hjonli

drutta *Crataegus uniflora* is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[161, 177]. The fruit is about 10mm in diameter and is borne in small clusters[200]. The fruit is usually borne singly, or in groups of up to 3 fruits[235]. It can be up to 16mm in diameter and has a firm flesh[235]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

help protect the plant from disease and insect predation[18, 20]. Grows badly with boxwood[18]. Hybridizes freely with other members of this genus[80]. Plants in this genus are notably susceptible to honey fungus[200].

5.2.393 *Pyrus phaeocarpa*

4 tlin 8 cyuc 2 kcaak 0 tcan 0 dwat 7 m hkuc hmimhtut cyutli hgattcup hwicli hrasjltunykfrrip hpa7tli flatprikwlis hpa7tmwatli xre7t hjonli

drutta *Pyrus phaeocarpa* is a deciduous Tree growing to 7 m (23ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in May, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177]. The fruit is up to 2cm long[200].

tcanta RootstockThis species is often used as stock to graft pear cultivars[266].

nrakta E. Asia - N. China. ksacta Slopes, mixed hillside forests of the Loess Plateau at elevations of 100 - 1200 metres[266].

propta Seed - best sown in a cold frame as soon as it is ripe in the autumn, it will then usually germinate in mid to late winter. Stored seed requires 8 - 10 weeks cold stratification at 1°c and should be sown as early in the year as possible[200]. Temperatures over 15 - 20°c induce a secondary dormancy in the seed[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for their first year. Plant them out in late spring or early summer of the following year.

nwatta Prefers a good well-drained loam in full sun[200]. Grows well in heavy clay soils. Tolerates light shade but does not fruit so well in such a position. Tolerates atmospheric pollution, excessive moisture and a range of soil types if they are moderately fertile[200]. Established plants are drought tolerant[200]. Plants are hardy to about -15°c[200].

5.2.394 *Prinsepia sinensis*

Cherry prinsepia

4 tlin 8 cyuc 2 kcaak 0 tcan 0 dwat 1.8 m hkuc hmimhtut cyutli tcup hwicli hrasjltunyk hpa7tli flatprikwlis hpa7tmwatli xre7t hjonli

drutta *Prinsepia sinensis* is a deciduous Shrub growing to 1.8 m (6ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from April to May, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[1, 105, 177]. Red and juicy[11]. A pleasant sour taste[74], they can be eaten out of hand or made into jellies[183]. The plum-shaped fruit is about 15mm long with one large seed[200].

nrakta E. Asia - Northern China to Manchuria. ksacta In the shade of mixed forests and in shrubberies, especially on pebbly or alluvial soils[74]. Mixed forests, forests of shady slopes, open places on slopes and beside streams in northern China[266].

propta Seed - best if given 2 months cold stratification[113]. Sow the seed in autumn if possible, otherwise in late winter or early spring in a cold frame in light shade. Germination may be inhibited by light[113]. Prick out the seedlings when they are large enough to handle into individual pots. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame[113].

nwatta Succeeds in any moderately fertile well-drained soil in full sun or light shade[182, 200]. The plants produce flowers and fruits better when they are growing in full sun[200]. Flowers are produced on the previous seasons wood[200]. They are produced on old wood according to another report[182]. This plant has a potential for commercial fruit production[74]. Unfortunately, it only fruits in Britain after long hot summers[200].

5.2.395 *Pyrus elaeagnifolia kotschyana*

4 tlin 8 cyuc 2 kcaak 0 tcan 0 dwat m hkuc hmimhtut cyutli hgatkuyctcup hwicli hrasjltunykfrrip hpa7tli flatprikwlis hpa7tmwatli xre7t hjonli

drutta *Pyrus elaeagnifolia kotschyana* is a deciduous Tree. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in April. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105]. The flesh is rather tough and gritty, but has a reasonable flavour when it is fully ripe[K]. The fruit is up to 2cm long[200].

nrakta W. Asia. ksacta Rocky limestone slopes and forests, 1000 - 1850 metres in Turkey[93].

propta Seed - best sown in a cold frame as soon as it is ripe in the autumn, it will then usually germinate in mid to late winter. Stored seed requires 8 - 10 weeks cold stratification at 1°c and should be sown as early in the year as possible[200]. Temperatures over 15 - 20°c induce a secondary dormancy in the seed[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for their first year. Plant them out in late spring or early summer of the following year.

nwatta Prefers a good well-drained loam in full sun[200]. Grows well in heavy clay soils. Tolerates light shade but does not fruit so well in such a position. Tolerates atmospheric pollution, excessive moisture and a range of soil types if they are moderately fertile[200]. Established plants are drought tolerant[200]. Plants are hardy to at least -15°c[200]. This sub-species differs from *P. eleagnifolia* in having thornless branches[200]. Closely related to *P. georgica*[93].

5.2.396 *Crataegus jackii*

4 tlin 8 cyuc 2 kcaak 0 tcan 2 dwat 3 m hkuc hmimhtut cyutli hgattcuphja7n hwicli hrasjltunykfrrip hpa7tli flatprikwlis hpa7tmwatli xre7t hjonli

drutta *Crataegus jackii* is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177, 235]. The fruit can be used in making pies, preserves, etc. and can also be dried for later use. The fruit is about 12mm in diameter[200]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as

acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta Eastern N. America - Quebec to Ontario. ksacta Calcareous ridges and banks of streams[43].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

5.2.397 *Malus brevipes*

4 tlin 8 cyuc 2 kcaak 0 tcan 0 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasljutnyikfrp hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Malus brevipes* is a deciduous Tree growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177].

nrakta N. America. ksacta Not known

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. It usually germinates in late winter.

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

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[1, 200]. The fruit is a good wildlife food source, especially for birds[200]. Hybridizes freely with other members of this genus[200]. Plants in this genus are notably susceptible to honey fungus[200].

5.2.398 *Pachysandra terminalis*

Japanese Spurge, Japanese pachysandra, Pachysandra
4 tlin 8 cyuc 2 kcaak 0 tcan 0 dwat 0.2 m hkuc pcmhmim cyutli hqatkyuctcup hwicli hrasljutnyik hpa7tli frusflatprikliwisslip hpa7tmwatli hjonli

drutta *Pachysandra terminalis* is an evergreen Shrub growing to 0.2 m (0ft 8in) by 0.5 m (1ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf all year, in flower from April to May, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. Sweet and juicy[105]. The ovoid fruits are 5 - 6mm long[266]. The fruit is not usually produced in cultivation[200] - this could be because both male and female plants are required and most people only grow one plant.

tcanta A very useful ground cover plant for a shady position, spreading by means of underground runners[182, 190]. A vigorous grower, but it is not too invasive[200]. It grows well in the shade of shrubs[K].

nrakta E. Asia - China, Japan. ksacta Moist deciduous woods in valleys and low mountains to 2000 metres[187, 200].

propta Seed - we have no information on this species but suggest sowing the seed in a cold frame as soon as it is ripe if this is possible, otherwise sow it in late winter. Prick out the seedlings into individual pots when they are large enough to handle and grow on in a shady part of the greenhouse or cold frame. Plant out in early summer of the following year. Cuttings of half-ripe wood, 4 - 7cm long taken at a node, June - August in a shady position in a frame[78]. Division in spring[200]. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer[K].

nwatta Landscape Uses:Border, Container, Erosion control, Ground cover, Rock garden, Woodland garden. A very tolerant plant, it thrives in any moist well-drained soil[11, 200]. Easily grown in a loose leafy soil succeeding in dry shade[187] and tolerating drought once it is established[190]. Grows well under trees[11]. Dislikes dry soils, full sun and strong winds[200]. Prefers a lime-free soil[182] according to one report whilst another says that it succeeds in acid and alkaline soils[200]. Hardy to about -25°C[187]. Plants are monoecious and rarely if ever produce fruit in cultivation[187, 200]. The flowers have a pleasant sweet fragrance[245]. At least one named form has been selected for its ornamental value[187]. Special Features: Attractive foliage, Not North American native, Naturalizing, Fragrant flowers, Inconspicuous flowers or blooms.

propta Seed - we have no information for this species but suggest sowing the seed in early spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Cuttings of half-ripe wood are worth trying in July/August.

nwatta An easily grown plant[200], succeeding in a sunny position in most well-drained soils[11, 200]. Tolerates alkaline and saline soils[11]. Plants can be dioecious or monoecious. Male and female plants must be grown if seed is required.

5.2.472 *Morus mongolica*

Mongolian Mulberry
4 tlin 8 cyuc 2 kcaak 0 tcan 1 dwat m hkuc hmimhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli fyfnyanhjen hjonli

drutta *Morus mongolica* is a deciduous Tree growing to 7.5 m (24ft 7in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from April to May, and the seeds ripen from July to August. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw[3, 105]. Sweet but insipid[1, 11]. Palatable[109, 177]. The fruit is up to 25mm in diameter[200].

tcanta Fibre MiscellanyThe fibers of the bark are raw material for textile and paper making[266].

dwatta MiscellanyThe bark is used medicinally[266]. No more details are given.

nrakta E. Asia - China, Japan, Korea. ksacta On cliffs and in ravines to 2000 metres in W. China[109]. Mountain slopes, high mountains and forests at elevations of 500 - 3500 metres[266].

propta The seed germinates best if given 2 - 3 months cold stratification[80, 98]. Sow the seed as soon as it is ripe if possible, otherwise in February in a cold frame. The seed usually germinates in the first spring, though it sometimes takes another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the cold frame for their first winter. Plant them out in late spring or early summer after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame. Plant out in spring. A good percentage take, though they sometimes fail to thrive[78, 113]. Cuttings of mature wood of the current season's growth, 25 - 30cm with a heel of 2 year old wood, autumn or early spring in a cold frame or a shady bed outside[78, 113, 200]. Bury the cuttings to threequarters of their depth. Layering in autumn[200].

nwatta Prefers a warm well-drained loamy soil in a sunny position[1, 11]. Closely allied to *M. alba*[1], and considered to be no more than part of that species by some botanists[200]. Mulberries have brittle roots and so need to be handled with care when planting them out[238]. Any pruning should only be carried out in the winter when the plant is fully dormant because mulberries bleed badly when cut[238]. Ideally prune only badly placed branches and dead wood[238]. Plants in this genus are notably resistant to honey fungus[200]. This species is dioecious[266]. Both male and female plants will need to be grown if fruit is required.

5.2.473 *Hierochloe odorata*

Holy Grass
4 tlin 8 cyuc 2 kcaak 0 tcan 2 dwat 0.6 m hkuc hmimhtut cyutli kyuctcuphja7n hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Hierochloe odorata* is a PERENNIAL growing to 0.6 m (2ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline)

soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry moist or wet soil.

pcista The plant contains coumarin, this is toxic if taken internally[169] and is sometimes considered to be carcinogenic[222].

kcakta Edible Parts: SeedEdible Uses: Colouring Condi- mentSeed - cooked[105]. Small and fiddly to use. It almost certainly does not contain coumarin and should be safe to use. An essential oil from the leaves is used as a food flavouring in sweets and soft drinks. It has a strong vanilla-like flavour[183]. The leaves are added to vodka as a flavouring[238]. The plant is said to be used as a colouring agent[183] but no more details are given.

tcanta Basketry Hair Incense Repellent Soil stabilization Strewing StuffingThe dried leaves are used as an incense[46, 61, 99], they were formerly also used as a strewing herb[1, 46, 238] and have been used as a stuffing in pillows and mattresses[257]. They have also been used as an insect repellent in the clothes cupboard where they impart a nice smell to the clothes[99, 238]. The leaves are used to make aromatic baskets[46, 61, 99, 169, 171]. The wet leaves can be sewn together, dried until they are tight and then resin used over the stitches to make a waterproof container[257]. The leaves can be soaked in water to make a tonic hair wash[257]. An essential oil distilled from the leaves is used in perfumery where it acts as an excitant and fixative for other aromas[238]. The plant has a very aggressive root system and has been planted to stabilize banks[74].

dwatta Birthing aid Febrifuge Skin VDA tea made from the leaves is used in the treatment of fevers, coughs, sore throats, chafing and venereal infections[222, 257]. It is also used to stop vaginal bleeding and to expel afterbirth[222]. The stems can be soaked in water and used to treat wind-burn and chapping and as an eyewash[257]. Some caution is advised when using this plant internally, see the notes above on toxicity[222]. The leaves are harvested in the summer and dried for later use[238]. Smoke from the burning leaves has been inhaled in the treatment of colds[257].

nrakta Central and northern Europe, including Britain, to N. Asia and N. America. ksacta Wet banks in only a few sites in Scotland[17].

propta Seed - sow spring in situ and only just cover the seed[162]. Germination usually takes place within 2 weeks. If the seed is in short supply it can be sown in the cold frame in the spring. When large enough to handle, prick the seedlings out into individual pots and plant them out in early summer. Division in spring or summer[162]. Very simple, virtually any part of the root will regrow to make a new plant[K].

nwatta Prefers a damp position in a rich soil but succeeds in most soils including quite dry conditions[162]. Grows best in a sunny position[238]. The plants have a running root system and can spread aggressively when grown in suitable conditions[74]. The plant, as it dries, emits a powerful scent of newly mown hay[245].

5.2.474 *Calystegia hederacea*

Japanese false bindweed
4 tlin 8 cyuc 2 kcaak 0 tcan 1 dwat 5 m hkuc htut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Calystegia hederacea* is a PERENNIAL CLIMBER growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista Although no reports of toxicity have been seen for this species, at least some, if not all members of this genus are purgative[173], some caution is advised.

kcakta Edible Parts: Leaves RootEdible Uses: Root - cooked[105, 177], then washed and steamed. Considered to be very nutritious, it is rich in starch and sugar but it should not be eaten regularly[179]. Young shoots - cooked[105, 177].

dwatta DiureticThe seed is simmered in water as a diuretic to stimulate kidney secretions[218].

Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multi-stemmed with multiple stems from the crown [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

5.2.469 Polygonum sachalinense

Giant Knotweed

4 tlin 8 cyuc 2 kcaak 0 tcan 0 dwat 3.6 m hkuc
hmmihtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliw hpa7tmwatli nyanhjen hjonli

drutta Polygonum sachalinense is a PERENNIAL growing to 3.6 m (11ft) by 3 m (9ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to October, and the seeds ripen from August to October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). . The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

picta Although no specific mention has been made for this species, there have been reports that some members of this genus can cause photosensitivity in susceptible people. Many species also contain oxalic acid (the distinctive lemony flavour of sorrel) - whilst not toxic this substance can bind up other minerals making them unavailable to the body and leading to mineral deficiency. Having said that, a number of common foods such as sorrel and rhubarb contain oxalic acid and the leaves of most members of this genus are nutritious and beneficial to eat in moderate quantities. Cooking the leaves will reduce their content of oxalic acid. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcaakta Edible Parts: Leaves Seed StemEdible Uses: Young shoots in spring - raw or cooked[46, 61, 116, 183]. They can be added to salads or cooked as an asparagus substitute[183]. They have an acid flavour and we find that they are more like a rhubarb substitute. Older stems and shoot tips - cooked. The stems are best peeled. Tasting like a mild version of rhubarb, they have a superior quality with a hint of lemon in the flavour[183]. Seed - cooked[105]. The seed can be ground into a powder and used as a thickener and flavouring in soups etc, or as an extender in flour. It is rather small and fiddly to utilize.

tcanta BiomassA potential source of biomass. Plants are very vigorous and could be grown as a ground cover[208].

nrakta E. Asia - Japan. Occasionally naturalized in Britain[17]. ksacta Along ravines and by streams in montane areas of Sakhalin Island[58].

propta Seed - sow spring in a cold frame. Germination is usually free and easy. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer if they have reached sufficient size. If not, overwinter them in a cold frame and plant them out the following spring after the last expected frosts. Division in spring or autumn. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them out in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Succeeds in ordinary garden soil in sun or shade[1, 111]. Hardy to about -25°C[187]. An extremely invasive plant, capable of sending up new shoots at a considerable distance from the main clump[1]. Considered a pest in many areas, if grown in the garden it should be planted within a barrier to contain its roots. Plants seem to be immune to the predations of rabbits[233]. Dioecious, male and female plants must be grown if seed is required.

5.2.470 Primula denticulata

Drumstick Primula

4 tlin 8 cyuc 2 kcaak 0 tcan 0 dwat 0.3 m hkuc
hmmihtut cyutli tcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatprikliw hpa7tmwatli xre7t hjonli

drutta Primula denticulata is a PERENNIAL growing to 0.3 m (1ft) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcaakta Edible Parts: FlowersEdible Uses: Flowers - raw[105, 177]. They make a very attractive addition to salads[183].

tcanta Plants can be grown as a ground cover, they are best spaced about 35cm apart each way[208].

nrakta E. Asia - Himalayas. ksacta Shrubberies and open slopes in moist situations, often along drains, 1500 - 4500 metres[51, 145].

propta Seed - best sown as soon as it is ripe in a cold frame[133]. Sow stored seed in early spring in a cold frame[1]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Root cuttings[200].

nwatta Easily grown in any moist soil in sun or part shade[187, 200]. Prefers a damp position[133, 200]. Grows well in heavy clay soils[208]. Dislikes very light or dry soils[1]. Grows well in the shade of a north-facing wall[208]. Plants are hardy to about -25°C[187]. A very ornamental plant, there are many named varieties[187]. It can be grown in a wild garden, rock garden or the flower border[1].

5.2.471 Sarcobatus vermiculatus

Greasewood

4 tlin 8 cyuc 2 kcaak 0 tcan 1 dwat 2.7 m hkuc
htut cyutli hgatkytucup hwicli hrasjlutnyik hpa7tli flatprikliw wissliphom hpa7tmwatli nyanhjen hjonli

drutta Sarcobatus vermiculatus is a deciduous Shrub growing to 2.7 m (8ft 10in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in July, and the seeds ripen in September. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline and saline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcaakta Edible Parts: Leaves SeedEdible Uses: Young shoots - cooked[105, 161]. Used as greens[257]. The young twigs are cut into short pieces and boiled until tender[183]. The seeds are occasionally consumed[61, 105, 161, 183]. They are used as a food at times when other foods are in short supply[257]. The seeds are about 2mm in diameter[270].

tcanta Fuel WoodThe wood is used for fuel, for want of better materials in the areas where it grows wild[235]. The wood is strong[257]. It has been used in general construction[257].

dwatta Astringent Odontalgic StingsThe crushed leaves have been used to treat insect bites[257]. An infusion of the burnt plant has been used in the treatment of diarrhoea and bleeding from the rectum[257]. The wood or the roots can be heated until they are burnt or blackened and then used on aching and decayed teeth[257].

nrakta South-western N. America - Nebraska and Wyoming to Nevada and New Mexico. ksacta Alkaline or saline soils in semiarid or arid plains, alkali flats, slopes, desert-shrub communities, sagebrush, saltflats, roadsides, fencerows, dry washes at elevations of 600 - 2400 metres[270].

5.2.399 Smilax hispida

Hag Briar

4 tlin 8 cyuc 2 kcaak 0 tcan 2 dwat 15 m hkuc
hmmihtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliw wisslip hpa7tmwatli nyanhjen hjonli

drutta Smilax hispida is a deciduous Climber growing to 15 m (49ft 3in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in June. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). . The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcaakta Edible Parts: Leaves RootEdible Uses: Leaves and young shoots - raw or cooked[102]. Root - cooked. It can be dried, ground into a powder and then used with cereals for making bread etc[2, 62, 102]. It can also be used as a gelatine substitute[2, 62, 102].

dwatta Birthing aid Poultice RubefacientThe stem prickles have been rubbed on the skin as a counter-irritant to relieve localised pains, muscle cramps and twitching[222]. A tea made from the leaves and stems has been used in the treatment of rheumatism and stomach problems[222]. The wilted leaves are applied as a poultice to boils[222]. A tea made from the roots is used to help the expelling of afterbirth[222]. Reports that the roots contain the hormone testosterone have not been confirmed, they might contain steroid precursors, however[222].

nrakta Eastern and Central N. America - Connecticut to Ontario, Minnesota, Nebraska, N. Carolina and Texas. ksacta Rich, often calcareous, soils in woods, thickets and botoms[43].

propta Seed - sow March in a warm greenhouse[1]. This note probably refers to the tropical members of the genus, seeds of plants from cooler areas seem to require a period of cold stratification, some species taking 2 or more years to germinate[K]. We sow the seed of temperate species in a cold frame as soon as we receive it, and would sow the seed as soon as it is ripe if we could obtain it then[K]. When the seedlings eventually germinate, prick them out into individual pots when they are large enough to handle and grow them on in the greenhouse for at least their first year, though we normally grow them on in pots for 2 years. Plant them out into their permanent positions in early summer. Division in early spring as new growth begins[238]. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer. Cuttings of half-ripe shoots, July in a frame[238].

nwatta Succeeds in most soils in sun or semi-shade[200]. Plants are hardy to about -15°C[200]. A very ornamental plant[1], it thrives in Britain[11]. Dioecious. Male and female plants must be grown if seed is required.

5.2.400 Orchis ustulata

Dark-Winged Orchis

4 tlin 8 cyuc 2 kcaak 0 tcan 2 dwat 0.2 m hkuc
htut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatprikliw wisslip hpa7tmwatli xre7t hjonli

drutta Orchis ustulata is a BULB growing to 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers moist or wet soil.

kcaakta Edible Parts: RootEdible Uses: DrinkRoot - cooked[2, 4, 46]. It is a source of 'salep', a fine white to yellowish-white powder that is obtained by drying the tuber and grinding it into a powder[2, 105, 177]. Salep is a starch-like substance with a sweetish taste and a faint somewhat unpleasant smell[4]. It is said to be very nutritious and is

made into a drink or can be added to cereals and used in making bread etc[100, 183]. One ounce of salep is said to be enough to sustain a person for a day[100, 115].

dwatta Antiflatulent Demulcent NutritiveSalep (see above for more details) is very nutritive and demulcent[4]. It has been used as a diet of special value for children and convalescents, being boiled with water, flavoured and prepared in the same way as arrowroot[4]. Rich in mucilage, it forms a soothing and demulcent jelly that is used in the treatment of irritations of the gastro-intestinal canal[4]. One part of salep to fifty parts of water is sufficient to make a jelly[4]. The tuber, from which salep is prepared, should be harvested as the plant dies down after flowering and setting seed[4].

nrakta Europe, including Britain, from Scandinavia south and east to Spain, the Caucasus and Siberia. ksacta Chalk downs and limestone pastures[17], it is also found in marshy places[42].

propta Seed - surface sow, preferably as soon as it is ripe, in the greenhouse and do not allow the compost to dry out. The seed of this species is extremely simple, it has a minute embryo surrounded by a single layer of protective cells. It contains very little food reserves and depends upon a symbiotic relationship with a species of soil-dwelling fungus. The fungal hyphae invade the seed and enter the cells of the embryo. The orchid soon begins to digest the fungal tissue and this acts as a food supply for the plant until it is able to obtain nutrients from decaying material in the soil[200]. It is best to use some of the soil that is growing around established plants in order to introduce the fungus, or to sow the seed around a plant of the same species and allow the seedlings to grow on until they are large enough to move. Division of the tubers as the flowers fade[230]. This species produces a new tuber towards the end of its growing season. If this is removed from the plant as its flowers are fading, the shock to the plant can stimulate new tubers to be formed. The tuber should be treated as being dormant, whilst the remaining plant should be encouraged to continue in growth in order to give it time to produce new tubers[230]. Division can also be carried out when the plant has a fully developed rosette of leaves but before it comes into flower[230]. The entire new growth is removed from the old tuber from which it has arisen and is potted up, the cut being made towards the bottom of the stem but leaving one or two roots still attached to the old tuber. This can often be done without digging up the plant. The old tuber should develop one or two new growths, whilst the new rosette should continue in growth and flower normally[230].

nwatta Prefers a sunny position and a good limey loam soil[42]. Requires a deep rich soil[1]. Orchids are, in general, shallow-rooting plants of well-drained low-fertility soils. Their symbiotic relationship with a fungus in the soil allows them to obtain sufficient nutrients and be able to compete successfully with other plants. They are very sensitive to the addition of fertilizers or fungicides since these can harm the symbiotic fungus and thus kill the orchid[230]. This symbiotic relationship makes them very difficult to cultivate, though they will sometimes appear uninvited in a garden and will then thrive. Transplanting can damage the relationship and plants might also thrive for a few years and then disappear, suggesting that they might be short-lived perennials[230]. Plants can succeed in a lawn in various parts of the country. The lawn should not be mown early in the year before or immediately after flowering[200]. Plant out bulbs whilst the plant is dormant, preferably in the autumn[200]. Bulbs can also be transplanted with a large ball of soil around the roots when they are in leaf, they are impatient of root disturbance[1]. Plants seem to be immune to the predations of rabbits[233]. The flowers diffuse a powerful almond-like scent[245]. Cultivated plants are very susceptible to the predation of slugs and snails[230].

5.2.401 Silphium laciniatum

Compass Plant, Robinson's compassplant

4 tlin 8 cyuc 2 kcaak 0 tcan 2 dwat 2 m hkuc
hmmihtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliw hpa7tmwatli xre7t hjonli

drutta Silphium laciniatum is a PERENNIAL growing to 2 m (6ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from July to August, and the seeds ripen from August to September. The species

is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pista There is a report that the plant might be toxic[222].

kcakta Edible Parts: Edible Uses: GumA resin exudes naturally from the plant, and can also be obtained by incision[4]. It is an inexpensive substitute for mastic and is used as a chewing gum to sweeten the breath[4, 61, 105, 257]. It forms on the upper part of the flowering stem[183].

dwatta Diuretic Emetic Expectorant Tonic VermifugeThe resin obtained from the plant is diuretic[4, 61, 222]. It imparts a strong aromatic odour to urine[4]. A tea made from the roots is vermifuge and a tonic for general debility[4, 61, 222]. It is used as an expectorant in coughs and other pulmonary ailments[4]. A decoction of the smaller roots has been used as an emetic[257]. A tea made from the leaves is emetic, it has also been used in the treatment of coughs, lung ailments and asthma[222].

nrakta Central N. America - Ohio to Minnesota, south to Alabama and Texas. ksacta Prairies and glades[222]. Calcareous or sandy soils and prairies in Texas[274].

propta Seed - best sown as soon as it is ripe in a greenhouse[200]. Prick out the seedlings into individual pots as soon as they are large enough to handle and plant them out in the summer. Division in spring[188]. This is very difficult due to the deep and extensive root system.

nwatta Industrial Crop: Hydrocarbon Management: Standard Wild CropSucceeds in any ordinary garden soil[1]. Prefers a deep moisture retentive moderately fertile soil that is not too nitrogen rich, in sun or dappled shade[200]. Prefers a shady position[200]. A very ornamental plant[1]. Leaves of young plants tip vertically and align themselves north to south to minimise exposure to the midday sun[200]. Plants have a deep and extensive root system which makes transplanting difficult[200]. The plant is heat tolerant in zones 9 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2].

5.2.402 Malus halliana

Hall crab apple

4 tin 8 cyuc 2 kcaak 0 tcan 0 dwat 4 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnykfrp hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Malus halliana is a deciduous Tree growing to 4 m (13ft 1in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177]. 6 - 8 mm in diameter[200]. A healthy tree at Kew in September 1989 had small acid fruits[K].

nrakta E. Asia - Japan? ksacta Not known in a truly wild situation.

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. It usually germinates in late winter. Stored seed requires stratification for 3 months at 1°C and should be sown in a cold frame as soon as it is received[200]. It might not germinate for 12 months or more. Prick out the seedlings into individual pots as soon as they are large enough to handle. If given a rich compost they usually grow away quickly and can be large enough to plant out in late summer, though consider giving them some protection from the cold in their first winter. Otherwise, keep them in pots in a cold frame and plant them out in late spring of the following year. Cuttings of mature wood, November in a frame[111].

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade, though it fruits less well in such a situation[200]. The sub-species M. halliana spontanea. (Mak.)Koidz. has slightly larger fruits than the type, they are up to 1 cm in diameter[200]. Hybridizes freely with other members of this genus[200]. The fruit is a good wildlife food source, especially for birds[200]. Plants in this genus are notably susceptible to honey fungus[200].

5.2.403 Oxalis exilis

Least Yellow Sorrel, Shady woodsorrel

4 tin 8 cyuc 2 kcaak 0 tcan 2 dwat 0.1 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyk hpa7tli flatprikliwis hpa7tmwatli fyixfre7t hjonli

drutta Oxalis exilis is a ANNUAL/PERENNIAL growing to 0.1 m (0ft 4in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

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

kcakta Edible Parts: Flowers LeavesEdible Uses: Leaves - raw or cooked[2, 46, 61, 105]. Added to salads, cooked as a potherb with other milder flavoured greens or used to give a sour flavour to other foods[183]. The leaves are available all the year round unless the winter is very cold, they have a pleasantly sour taste[114], but are very small and fiddly to harvest[K]. The leaves contain about 86% water, 2.3% protein, 0.8% fat, 8.2% carbohydrate, 150mg calcium, 78mg phosphorus, 8mg iron, 0.6mg niacin, 78mg vitamin C, 6050µg beta carotene[173]. The leaves contain between 7 - 12% oxalate[218]. Use in moderation, see notes at top of sheet, Flowers - raw. A nice acid flavour and a pleasant addition to the salad bowl[K].

dwatta Urinary Vitamin CThe whole plant is antihelmintic, antiplogistic, astringent, depurative, diuretic, emmenagogue, febrifuge, lithontriped, stomachic and stypic[147, 178, 218, 240]. It is used in the treatment of influenza, fever, urinary tract infections, enteritis, diarrhoea, traumatic injuries, sprains and poisonous snake bites[147]. An infusion can be used as a wash to rid children of hookworms[257]. The plant is a good source of vitamin C and is used as an antiscorbutic in the treatment of scurvy[240]. The leaves are used as an antidote to poisoning by the seeds of Datura spp, arsenic and mercury[218]. The leaf juice is applied to insect bites, burns and skin eruptions[218]. It has an antibacterial activity[218].

drutta Succisa pratensis is a PERENNIAL growing to 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to October, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in saline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young shoots - raw[7]. The tender young shoots are sometimes added to spring salads[7].

tcanta DyeA green dye is obtained from the leaves[7, 115].

dwatta Anthelmintic Demulcent Depurative Diaphoretic Diuretic Eczema Emmenagogue Expectorant Febrifuge StomachicThe herb is antihelmintic, demulcent, depurative, slightly diaphoretic, diuretic, emmenagogue, mildly expectorant, febrifuge and stomachic[4, 7, 9]. It makes a useful tea for the treatment of coughs, fevers and internal inflammations and is also a popular application externally to eczema and other cutaneous eruptions[4, 7]. A tincture of the plant is a gentle but reliable treatment for bruises, aiding quick re-absorption of the blood pigment[7]. The whole herb is collected in early autumn and dried for later use[4]. Good results have been achieved by using a distilled water from the plant as an eye lotion to treat conjunctivitis[7].

nrakta Europe, including Britain, south and east from Norway to N. Africa, Siberia and the Caucasus. ksacta Meadows, pastures, marshes, fens and damp woods[7, 17] on slightly acid or calcareous soils[200].

propta Seed - sow April in a cold frame. Germination is usually rapid, but the seedlings are prone to damp off so make sure they are well ventilated[1]. Prick them out into individual pots once they are large enough to handle and plant them out in the summer. Division in spring. Plant them straight out into their permanent positions.

nwatta Succeeds in ordinary garden soil[1], preferring damp conditions[24, 200], in sun or semi-shade[200]. Prefers a moist peaty soil[187]. Hardy to about -20°C[187]. Grows well in the summer meadow[24], it is an excellent bee and butterfly plant and a food plant for the caterpillars of many butterfly species[17, 24, 30].

5.2.467 Hosta longissima

Swamp Hosta

4 tin 8 cyuc 2 kcaak 0 tcan 0 dwat 0.2 m hkuc hmimhtut cyutli tucphja7n hwicli hrasjlutnykfrp hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Hosta longissima is a PERENNIAL growing to 0.2 m (0ft 8in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from July to August, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: Leaves StemEdible Uses: Young leaves and leaf stems - cooked[105, 177].

nrakta E. Asia - Japan. ksacta Swampy grassland and other wet places, often exposed to full sun in the spring but then shaded in the summer by the long grasses it grows amongst[251].

propta Seed - sow spring in a lightly shaded position in a greenhouse and only just cover the seed. Germination usually takes place within 1 - 3 months at 10°C. Make sure you keep the compost moist. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division is possible at almost any time of the year so long as there is sufficient moisture[233]. It is best carried out in March as growth commences or in early autumn if the soil is not too dry[200]. Hostas can be left undivided for many years and

should not be divided any more frequently than once every 3 - 5 years to allow the leaves to reach maturity[200].

nwatta Thrives in most fertile soils if they are rich in humus[200]. Grows well in heavy clay soils and in sandy ones[208]. Very limy soils inhibit growth, but plants can thrive in such a situation if plenty of humus is added[208]. Prefers a pH between 6 and 7[200]. Requires a rich soil that does not dry out readily[1]. A plant of boggy places, it is flood tolerant[187]. Does well in the semi-shade of a woodland[200] also succeeding in deeper shade[187]. In general, the sunnier the position the moister the soil should be[233]. Plants are best not grown under trees in town gardens since the soot washed from the leaves of the trees in wet weather will tend to remain on the hosta[208]. Plants flower better when grown in a sunny position but the foliage is better when the plant is in a shady position[200]. Plants are in general fully hardy in Britain, but young leaves in spring can be destroyed by frost. New leaves are only produced in the spring and very early summer, so any damage at this time has a deep effect on the plant[233]. The rhizome creeps extensively[200]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Plants are very attractive to slugs and snails, the young shoots in spring are especially at risk[111, K]. A polymorphic species, it hybridizes freely with other members of this genus[200].

5.2.468 Aronia arbutifolia

Red Chokeberry

4 tin 9 cyuc 2 kcaak 0 tcan 0 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyk hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Aronia arbutifolia is a deciduous Shrub growing to 3 m (9ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in May, and the seeds ripen from October to December. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105]. It can also be dried and used for making pemmican[161, 183]. Fruit quality is rather variable, some forms are rather pleasant when fully ripe, especially if they have experienced some frost[2]. The fruit is about 7mm in diameter[200], it can hang on the plant for several months[235].

nrakta Eastern N. America - Massachusetts to Minnesota and south to Texas and Florida. ksacta Low woods, thickets, swamps, damp pine barrens etc[43].

propta Seed - best sown as soon as it is ripe in pots outdoors or in a cold frame[113]. Pre-soak stored seed overnight and then cold stratify for 3 months at 2°C[113]. The seed germinates in 1 - 3 months at 15°C[134]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter. Plant out in late spring. Cuttings of half-ripe wood, July/August in a frame[113]. Division of suckers in the dormant season[200]. Very easy, they can be planted straight out into their permanent positions. Layering[200].

nwatta Landscape Uses:Border, Erosion control, Foundation, Pest tolerant, Massing, Seashore, Specimen, Woodland garden. Prefers a moist peaty soil in full sun or partial shade[134]. Succeeds in most soils[1] but dislikes shallow chalk[200]. Tolerates atmospheric pollution[227]. Plants are hardy to about -25°C[184]. This genus is closely related to Sorbus species[200]. A suckering plant, it forms thickets in the wild[182]. Some named forms have been developed for their ornamental value[182]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: Attracts birds, North American native, Wetlands plant, Attracts butterflies. The plant is heat tolerant in zones 8 through 4. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat

and excessive menstruation[238, 254]. It is also used in the treatment of snake bites[243]. Externally, it is used to treat ulcerated mouths, vaginal discharges, nosebleeds and wounds[238, 243]. The plant can be used fresh or it can also be harvested when coming into flower and dried for later use[238]. The root is emmenagogue and galactagogue[243]. A paste of the root is used in the treatment of menorrhagia, gonorrhoea, eczema and colic[243, 272]. It helps to remove pus from boils[272]. The juice of the root is used in Nepal to treat fevers, urinary troubles, diarrhoea and dysentery[272]. It is also used, often combined with the root juice of *Dichrophela integra* and *Rubus ellipticus*, to treat stomach disorders and, on its own, to treat indigestion and vomiting that occur after eating unusual foods[272].

nrakta Tropical America. ksacta Roadsides, waste places and fields in South-eastern N. America[72].

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

nwatta Prefers a well-drained fertile soil in a sunny position[200]. Requires a hot sheltered position if it is to do well[K]. Plants should not be given inorganic fertilizers, see notes above on toxicity. Most if not all members of this genus photosynthesize by a more efficient method than most plants. Called the 'C4 carbon-fixation pathway', this process is particularly efficient at high temperatures, in bright sunlight and under dry conditions[196].

5.2.464 Helianthus laetiflorus

Showy Sunflower, Cheerful sunflower

4 tin 8 cyuc 2 kcaak 0 tcan 0 dwat 2 m hkuc
htut cyutili tcup hwicli hrasljutnyik hpa7tli flatprikliwis
hpa7tmwatli xre7t hjonli

drutta *Helianthus laetiflorus* is a PERENNIAL growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from August to October, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Tubers - raw or cooked[55, 105, K]. Used like Jerusalem artichokes, to which they are not much inferior in taste though yields are lower[95, 183].

nrakta Central N. America - Pennsylvania to Minnesota. ksacta Open woods and thickets, often on drier soils[43].

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

nwatta Succeeds in most soils in a sunny position[1]. Requires a rich soil[1]. Dislikes shade[1]. The young growth is extremely attractive to slugs, plants can be totally destroyed by them[K]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. A naturally occurring hybrid, *H. paciflorus* (or *H. rigidus* in another report) x *H. tuberosus*[200]. Plants have a running root system and can be very invasive[1]. This species is often grown as an ornamental plant, there are several named varieties[1]. The plant is heat tolerant in zones 9 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the

temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is tuberous with swollen potato-like roots [1-2].

5.2.465 Sorbus scopulina

Western Mountain Ash, Greene's mountain ash, Cascade mountain ash

4 tin 8 cyuc 2 kcaak 0 tcan 1 dwat 4 m hkuc
hmimhtut cyutili tcup hwicli hrasljutnyik hpa7tli flatprikliwis
hpa7tmwatli xre7t hjonli

drutta *Sorbus scopulina* is a deciduous Shrub growing to 4 m (13ft) by 4 m (13ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in May, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

pcista The seeds probably contain hydrogen cyanide. This is the ingredient that gives almonds their characteristic flavour. Unless the seed is very bitter it should be perfectly safe in reasonable quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw, cooked in pies, preserves etc., or dried for later use[62, 101, 183]. A bitter flavour[212]. The fruit becomes sweeter and so tastes best after a frost, it can also be blotted if it is going to be eaten raw[K]. This involves storing the fruit in a cool dry place until it is almost but not quite going rotten. At this stage the fruit of many species has a delicious taste, somewhat like a luscious tropical fruit. The fruit is up to 5mm across[200].

tcanta WoodThe wood is soft and weighs 37lb per cubic foot[235].

dwatta *Enuresis* Febrifuge TonicAn infusion of the branches has been given to young children with bed-wetting problems[257]. The bark is febrifuge and tonic[257]. It has been used in the treatment of general sickness[257].

nrakta N. America - Labrador to Alaska, south to Maine, Pennsylvania, Michigan, Colorado and Utah. ksacta Canyons and wooded slopes, 1200 - 2700 metres in California[71]. Moist and wet soils of hills and mountains to 2,700 metres[212].

propta Seed - best sown as soon as it is ripe in a cold frame[78, 80]. If you have sufficient seed it can be sown in an outdoor seedbed[78, 80]. Stored seed germinates better if given 2 weeks warm then 14 - 16 weeks cold stratification[98], so sow it as early in the year as possible. Prick out the seedlings into individual pots when they are large enough to handle. Seedlings are very slow to put on top-growth for their first year or two[11], but they are busy building up a good root system. It is best to keep them in pots in a cold frame for their first winter and then plant them out into their permanent positions in late spring.

nwatta Succeeds in most reasonably good soils in an open sunny position[11]. Dislikes dry soils[188]. Tolerates light shade[188], though it fruits better in a sunny position[K]. Plants are susceptible to fireblight[188].

5.2.466 Succisa pratensis

Devil's Bit Scabious, Devilsbit

4 tin 8 cyuc 2 kcaak 0 tcan 2 dwat 0.4 m hkuc
hmimhtut cyutili tcup hwicli hrasljutnyik hpa7tli flatprikliwish
som hpa7tmwatli xre7t hjonli

nrakta New Zealand and Tasmania. ksacta Arable land and waste places, it is a common garden weed[9, 17] where it tends to become especially troublesome in pots of plants growing in greenhouses etc[200].

propta Seed - best sown as soon as ripe in a cold frame. This plant does not need any encouragement.

nwatta A very easily grown plant, succeeding in a sandy soil in a warm dry position[11]. It prefers dry open habitats[50]. Spreading rapidly by seed and underground bulbils, this species can quickly become a nuisance, it is a common weed of pot plants in nurseries[200].

5.2.404 Yucca glauca

Soapweed, Soapweed yucca, Gurney's yucca, American Yucca, Yucca, Narrowleaf Yucca, Soapweed

4 tin 10 cyuc 2 kcaak 0 tcan 2 dwat 1.5 m hkuc
hmimhtut cyutili hgatkyuctcup hwicli hyishrasljutnyik hpa7tli
flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Yucca glauca* is an evergreen Shrub growing to 1.5 m (5ft) by 0.5 m (1ft 8in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in leaf all year, in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Hand. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure.

pcista The roots contain saponins[222]. Whilst saponins are quite toxic to people, they are poorly absorbed by the body and so tend to pass straight through. They are also destroyed by prolonged heat, such as slow baking in an oven. Saponins are found in many common foods such as beans[K]. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K].

kcakta Edible Parts: Flowers Fruit Leaves Seedpod StemEdible Uses: Fruit - raw or cooked[2, 46, 61, 161, 257]. Dry, with a bitter skin[85]. The fruit can be baked and either eaten immediately or formed into cakes and dried for later use[257]. The raw fruit can be dried for winter use[1, 257]. The immature fruits are peeled, boiled and served with seasonings[183]. The soaked, cooked fruit can be made into a syrup and used like hot chocolate[257]. The fruit is up to 8cm long and 12mm wide[2]. Flowers and flower buds - raw or cooked[61, 85]. Delicious raw, they can also be dried, crushed and used as a flavouring[164]. A delicious addition to the salad bowl, or used as a potherb[183]. Flowering stem - raw or cooked[62, 85, 161, 257]. It can be cooked and used like asparagus[164]. The white inner portion of the stem is eaten[183]. Seedpods - cooked. They can be boiled or roasted and used as a vegetable[257]. The plant crowns have been roasted and eaten in times of food shortage[257].

tcanta Basketry Broom Brush Fibre Hair Needles Soap String WeavingBoth the leaves, and a fibre obtained from the leaves, can be used for making cloth, ropes and mats[21, 57, 61, 82, 85, 169, 257]. The leaves can be split and used to make baskets[257]. The leaves are used as paint brushes and brooms[46, 85, 92]. The leaves can be split and used as a temporary tying material[257]. The sharp points of the leaves have been used as needles[257]. The roots are rich in saponins and can be used as a soap substitute[82, 85, 95]. The soap obtained from the root makes a good hair shampoo[95], it is said to be effective against dandruff and also to act as a tonic to stop the hair falling out[213, 257]. The shampoo also rids the body of lice and other parasites[257].

dwatta Antidandruff Contraceptive Oxytoxic Poultice SkinA soap made from the crushed roots is said to be an effective treatment for dandruff and skin irritations[213, 222]. A cold infusion of the root has been used to expedite the delivery of a child or the placenta[257]. The root is poulticed and applied to inflammations, wounds, bleeding cuts, sprains etc[222, 257]. The rotten root can be crushed and boiled to make suds. Drinking these suds is said to induce the menopause in women, thereby rendering them infertile[257].

nrakta Central N. America - Iowa to Texas and N. Dakota. ksacta Dry plains and sandy hills[43].

propta Seed - sow spring in a greenhouse. Pre-soaking the seed for 24 hours in warm water may reduce the germination time. It usually germinates within 1 - 12 months if kept at a temperature of 20°C. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse or cold frame for at least their first two winters. Plant them out into their permanent positions in early summer and consider giving them some winter protection for at least their first winter outdoors - a simple pane of glass is usually sufficient[K]. Seed is not produced in Britain unless the flowers are hand pollinated. Root cuttings in late winter or early spring. Lift in April/May and remove small buds from base of stem and rhizomes. Dip in dry wood ashes to stop any bleeding and plant in a sandy soil in pots in a greenhouse until established[78]. Division of suckers in late spring. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the following spring.

nwatta Landscape Uses:Border, Erosion control, Massing, Rock garden, Seashore, Specimen. Thrives in most soils but prefers a sandy loam and full exposure to the south[11]. Dislikes chalky or peaty soils[111]. Can succeed in light shade[K]. Plants are hardier when grown on poor sandy soils[200]. Prefers a hot dry position and a poor soil[166]. Established plants are very drought tolerant[200]. Hardy to at least -30°C according to one report[164], whilst another one says that it is hardy to about -15°C[200]. A very ornamental plant[1], it rarely flowers unless in a dry sandy soil[42]. The scent of the flowers is most pronounced at night[245]. In the plants native environment, its flowers can only be pollinated by a certain species of moth. This moth cannot live in Britain and, if fruit and seed is required, hand pollination is necessary. This can be quite easily and successfully done using something like a small paint brush[1]. Individual crowns are monocarpic, dying after flowering[233]. However, the crown will usually produce a number of sideshoots before it dies and these will grow on to flower in later years[233]. Plants in this genus are notably resistant to honey fungus[200]. Members of this genus seem to be immune to the predations of rabbits[233]. Special Features:Attractive foliage, North American native.

5.2.405 Ligustrum obtusifolium

Border privet

4 tin 7 cyuc 2 kcaak 0 tcan 0 dwat 3 m hkuc
hmimhtut cyutili tcup hwicli hrasljutnyiktrip hpa7tli flatprikliwis
hpa7tmwatli xre7t hjonli

drutta *Ligustrum obtusifolium* is an evergreen Shrub growing to 3 m (9ft 10in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in leaf all year, in flower in July, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no reports of toxicity have been seen for this species, at least one member of this genus is recorded as being mildly toxic and it is quite possible that other members of the genus also contain toxins[65].

kcakta Edible Parts: Edible Uses: Coffee TeaThe roasted seed is a coffee substitute[61, 177]. Leaves are a tea substitute[177].

tcanta WaxA commercial insect wax is produced on the branches as a result of eggs being laid by insects[111]. Another report says that the wax is produced by the plant due to the stimulation of the feeding insects[61]. Yet another report says that the wax is produced by the insects[178]. It is used for candles and as a polish for earthenware pots, book edges etc[178]. The sub-species *L. obtusifolium regelianum* and its cultivar 'Dart's Perfection' make a good carpeting ground cover about 1.2 metres tall. They should be spaced about 2.5 metres apart each way[208].

nrakta E. Asia - China, Japan. ksacta Thin woods and thickets in lowland and hills all over Japan[58]. Hills, gullies and woods at elevations of 100 - 600 metres in China[266].

propta The seed does not require any pre-treatment and can be sown in the spring in a cold frame[113]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5 - 10cm with a heel, July/August in a frame. Very easy[78]. Cuttings of mature wood, 20 - 30cm in a sheltered outdoor bed in November/December. High percentage[78].

nwatta Landscape Uses:Foundation, Hedge, Screen, Superior hedge. A very tolerant and easily grown plant, it succeeds in any soil that is not impoverished or water-logged[11, 182]. Grows well in heavy clay soils. A very ornamental plant[11]. Polymorphic[58]. Prefers hotter summers than are normally experienced in Britain[11]. Closely related to *L. ovalifolium*[200]. This species is notably susceptible to honey fungus[200]. Special Features:Not North American native, Invasive, Attractive flowers or blooms.

5.2.406 Malus sargentii

Sargent's apple, Sargent Crabapple
4 tin 8 cyuc 2 kcaak 0 tcan 0 dwat 4 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Malus sargentii* is a deciduous Shrub growing to 4 m (13ft) by 5 m (16ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in May, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[183]. Large for a crab apple[183], it is up to 1cm in diameter[200].

nrakta E. Asia - Japan. ksacta Mountains all over Japan[58].

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

nwatta Landscape Uses:Border, Pest tolerant, Specimen. An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[200]. Of doubtful botanical standing, it is considered to be synonymous with *M. sieboldii* by some Japanese botanists[182]. The fruit is a good wildlife food source, especially for birds[200]. Hybridizes freely with other members of this genus[200]. This species is considered to be no more than a part of *M. sieboldii* by many botanists[58]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features:Not North American native, Fragrant flowers, Attractive flowers or blooms.

5.2.407 Polygonum alpinum

Alpine Knotweed, Alaska wild rhubarb
4 tin 8 cyuc 2 kcaak 0 tcan 1 dwat 1 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Polygonum alpinum* is a PERENNIAL growing to 1 m (3ft 3in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been made for this species, there have been reports that some members of this genus can cause photosensitivity in susceptible people. Many species also contain oxalic acid (the distinctive lemony flavour of sorrel) - whilst not toxic this substance can bind up other minerals making them unavailable to the body and leading to mineral deficiency. Having said that, a number of common foods such as sorrel and rhubarb contain oxalic acid and the leaves of most members of this genus are nutritious and beneficial to eat in moderate quantities. Cooking the leaves will reduce their content of oxalic acid. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Edible Parts: Leaves Seed StemEdible Uses: DrinkLeaves - raw or cooked[2, 145]. They have an acid flavour and can be used as a sorrel substitute[74]. The chopped leaves and stems have been added to a thick pudding of flour and sugar then eaten[257]. Leaf stems - raw or cooked. An acid flavour, they can be cut into sections and used like rhubarb (*Rheum* spp)[257]. The juice from the plant has been sweetened and used as a refreshing drink[257]. Seed - raw or cooked. It is rather small and fiddly to utilize.

dwatta Astringent PectoralThe whole plant is astringent[74]. The raw roots and stem bases have been chewed as a treatment for coughs and colds[257].

nrakta Europe to E. Asia. ksacta Damp meadows, wood margins and mixed grass steppes[74]. Open humus-rich slopes, 2200 - 2700 metres in Kashmir[145].

propta Seed - sow spring in a cold frame. Germination is usually free and easy. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer if they have reached sufficient size. If not, overwinter them in a cold frame and plant them out the following spring after the last expected frosts. Division in spring or autumn. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Succeeds in an ordinary garden soil[1] but prefers a moisture retentive not too fertile soil in sun or part shade[200]. Grows well near water[1]. Repays generous treatment[1]. Plants seem to be immune to the predations of rabbits[233]. Plants can be invasive but they are easily controlled by spading around the clump[200].

5.2.408 Polygonatum falcatum

4 tin 8 cyuc 2 kcaak 0 tcan 1 dwat 0.6 m hkuc
pcimhmim cyutli hqatyuuctup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta *Polygonatum falcatum* is a PERENNIAL growing to 0.6 m (2ft) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in April. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers dry or moist soil and can tolerate drought.

pcista Although no reports of toxicity have been seen for this species, some members of this genus are believed to have poisonous fruits and seeds.

as a diet of special value for children and convalescents, being boiled with water, flavoured and prepared in the same way as arrowroot[4]. Rich in mucilage, it forms a soothing and demulcent jelly that is used in the treatment of irritations of the gastro-intestinal canal[4]. One part of salep to fifty parts of water is sufficient to make a jelly[4]. The tuber, from which salep is prepared, should be harvested as the plant dies down after flowering and setting seed[4].

nrakta Southern Europe, including Britain, from Belgium south and east to N. Africa and W. Asia. ksacta Wet marshes and wet meadows in the Channel Islands[230].

propta Seed - surface sow, preferably as soon as it is ripe, in the greenhouse and do not allow the compost to dry out. The seed of this species is extremely simple, it has a minute embryo surrounded by a single layer of protective cells. It contains very little food reserves and depends upon a symbiotic relationship with a species of soil-dwelling fungus. The fungal hyphae invade the seed and enter the cells of the embryo. The orchid soon begins to digest the fungal tissue and this acts as a food supply for the plant until it is able to obtain nutrients from decaying material in the soil[200]. It is best to use some of the soil that is growing around established plants in order to introduce the fungus, or to sow the seed around a plant of the same species and allow the seedlings to grow on until they are large enough to move. Division of the tubers as the flowers fade[230]. This species produces a new tuber towards the end of its growing season. If this is removed from the plant as its flowers are fading, the shock to the plant can stimulate new tubers to be formed. The tuber should be treated as being dormant, whilst the remaining plant should be encouraged to continue in growth in order to give it time to produce new tubers[230]. Division can also be carried out when the plant has a fully developed rosette of leaves but before it comes into flower[230]. The entire new growth is removed from the old tuber from which it has arisen and is potted up, the cut being made towards the bottom of the stem but leaving one or two roots still attached to the old tuber. This can often be done without digging up the plant. The old tuber should develop one or two new growths, whilst the new rosette should continue in growth and flower normally[230].

nwatta Requires a deep rich soil[1]. Plants can succeed in drier areas of bog gardens[230]. Orchids are, in general, shallow-rooting plants of well-drained low-fertility soils. Their symbiotic relationship with a fungus in the soil allows them to obtain sufficient nutrients and be able to compete successfully with other plants. They are very sensitive to the addition of fertilizers or fungicides since these can harm the symbiotic fungus and thus kill the orchid[230]. This symbiotic relationship makes them very difficult to cultivate, though they will sometimes appear uninvited in a garden and will then thrive. Transplanting can damage the relationship and plants might also thrive for a few years and then disappear, suggesting that they might be short-lived perennials[230]. Plants can succeed in a lawn in various parts of the country. The lawn should not be mown early in the year before or immediately after flowering[200]. Plant out bulbs whilst the plant is dormant, preferably in the autumn[200]. Bulbs can also be transplanted with a large ball of soil around the roots when they are in leaf, they are impatient of root disturbance[1]. Plants seem to be immune to the predations of rabbits[233]. Cultivated plants are very susceptible to the predation of slugs and snails[230].

5.2.462 Disporum trachycarpum

Fairybells

4 tin 8 cyuc 2 kcaak 0 tcan 1 dwat 0.5 m hkuc
pcimhmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Disporum trachycarpum* is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw[105, 161, 177, 257]. A sweet flavour[212]. The fruit is up to 10mm in diameter and is leathery rather than pulpy[235].

dwatta Ophthalmic PoulticeThe seed has been used to clear foreign objects from the eye. A fresh seed was inserted and the eye closed then rubbed until the seed was watered out with the foreign object clinging to it[257]. The seeds were also placed in the eye overnight and an infusion of the bark used as an eyewash to treat snow-blindness[257]. An infusion of the leaves has been used as a wash for wounds whilst a poultice of the dampened bruised leaves has been applied to bleeding wounds[257].

nrakta Western N. America - British Columbia to N.E. Oregon and south along the Rockies. ksacta Wooded slopes, often by streams, or in aspen groves, to 3000 metres[60].

propta Seed - best sown in a cold frame as soon as it is ripe[175]. Use a lime-free compost and keep it moist[175]. Stored seed requires 6 weeks cold stratification and should be sown as early in the year as possible[175]. Germination usually takes place within 3 - 6 months or more at 15°C[175]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring[200].

nwatta Best grown in partial shade in a moist peaty or woodland soil[1, 175]. A very hardy plant, tolerating temperatures down to about -20°C[187]. Plants spread well by means of creeping rhizomes when they are grown in a leafy soil[187]. This species is closely related to *D. smithii*[233].

5.2.463 Amaranthus spinosus

Spiny Amaranth

4 tin 11 cyuc 2 kcaak 1 tcan 3 dwat 0.6 m hkuc
htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyif hjonli

drutta *Amaranthus spinosus* is a ANNUAL growing to 0.6 m (2ft) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf from April to October; in flower from July to September, and the seeds ripen from August to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

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

kcakta Edible Parts: Leaves SeedEdible Uses: Leaves and stems - raw or cooked as a spinach[2, 61, 177]. If older leaves and stems are used the spines must be removed[183]. Highly esteemed[183]. The dried leaves contain (per 100g) 267 - 276 calories, 20 - 34.4% protein, 2 - 4.5% fat, 45 - 54% carbohydrate, 9.8 - 10.4% fibre, 16.6 - 24% ash, 1795 - 5333mg calcium, 333 - 460mg phosphorus, 13.5 - 152.7mg iron, 13 - 37mg sodium, 337 - 3528mg potassium, 27.9 - 40.8mg betacarotene equivalent, 0.06mg thiamine, 2.02mg riboflavin, 7.7 - 8.6mg niacin and 503mg ascorbic acid[218]. Seed - cooked. Very small, about 1mm in diameter[266], but easy to harvest and very nutritious. The seed can be cooked whole, and becomes very gelatinous like this, but it is rather difficult to crush all of the small seeds in the mouth and thus some of the seed will pass right through the digestive system without being assimilated[K]. a valued food plant in Africa. In Thai cuisine, where it is called phak koom and in Tamil mullik keera.

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

dwatta Antidote Astringent Diaphoretic Dysentery Eczema Emmenagogue Emollient Fibrifuge Urinary VDThe seed is used as a poultice for broken bones[218]. The plant is astringent, diaphoretic, diuretic, emollient, fibrifuge and galactagogue[4, 61, 147, 218, 238, 240, 272]. It is used internally in the treatment of internal bleeding, diarrhoea

nwatta Prefers a fertile soil in full sun[188], but is easily grown in any soil of at least moderate quality so long as it is well drained[1]. Closely related to *U. glabra*[11]. This species is resistant to 'Dutch elm disease', a disease that has destroyed the greater part of all the elm trees growing in Britain. The disease is spread by means of beetles. There is no effective cure (1992) for the problem, but most E. Asian, though not Himalayan, species are resistant (though not immune) to the disease so the potential exists to use these resistant species to develop new resistant hybrids with the native species[200]. The various species of this genus hybridize freely with each other and pollen is easily saved, so even those species with different flowering times can be hybridized[200].

5.2.459 *Malus glaucescens*

4 tlin 8 cyuc 2 kcaak 0 tcan 0 dwat 5 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyikfrp hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Malus glaucescens* is a deciduous Tree growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

kcaakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177]. Aromatic, it is 3-4cm in diameter[200].

tcanta The wood weighs 44lb per cubic foot[235].

nrakta Eastern N. America - Ontario to Michigan, south to New Jersey, South Carolina, Iowa and Missouri. ksacta Glades and open woods in rich soils[82].

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

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[1, 200]. The fruit is a good wildlife food source, especially for birds[200]. This species is closely related to *M. glabrata*[200]. It hybridizes freely with other members of the genus[200]. Plants in this genus are notably susceptible to honey fungus[200].

5.2.460 *Nyssa sylvatica*

Black Tupelo, Blackgum, Sour Gum, Black Tupelo

4 tlin 9 cyuc 2 kcaak 0 tcan 1 dwat 15 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli priklwis hpa7tmwatli xre7t hjonli

drutta *Nyssa sylvatica* is a deciduous Tree growing to 15 m (49ft) by 12 m (39ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in leaf from May to October, in flower in June, and the seeds ripen in October.

The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. It can tolerate atmospheric pollution.

kcaakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. A thin sharply acid pulp that is pleasant to roll in the mouth as a masticatory[183], it is also used in preserves[177, 183]. Pleasantly acidulous[2]. The fruit is up to 15mm in diameter and is borne in small clusters of 2-3[82, 200].

tcanta WoodWood - tough, not durable, soft, heavy, hard to work and warps easily. It has an intricately contorted and twisted grain[82]. It weighs 40lb per cubic foot and is used for making boxes, soles of shoes, wooden pipes, wheel hubs, veneer etc[43, 46, 61, 82, 171, 227, 235].

dwatta Emetic Ophthalmic VermifugeThe bark is emetic, ophthalmic and vermifuge[257]. An infusion has been used as a bath and also given to children with worms[257]. A strong decoction is used to cause vomiting when unable to retain food[257]. A strong ooze from the roots is used as eye drops[257].

nrakta Eastern N. America - Maine to Florida, west to Ontario and Texas. ksacta Low acid woods, swamps and shores in imperfectly drained soils[11, 43]. Also found on high wooded slopes in the south of its range[82].

propta The seed can be sown in late winter in a cold frame[78] but would probably benefit from an earlier sowing if the seed can be obtained any sooner. Three months stratification at 5°C improves germination[200]. Germination rates are variable[78]. As soon as they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Give the plants some protection from the cold for their first winter outdoors. Cuttings of half-ripe wood, July/August in a frame. Layering.

nwatta Landscape Uses:Firewood, Pest tolerant, Aggressive surface roots possible, Specimen. Although this is a plant of swamps and other wet soils in the wild, once established it can succeed in Britain when growing in an ordinary good loamy soil in sun or semi-shade[11, 200]. It prefers a neutral to alkaline soil according to one report[200], whilst another says that it requires a lime-free soil[98]. Tolerates atmospheric pollution and growing in maritime regions[200]. A very ornamental tree[1], it has a moderate rate of growth and moderate longevity[229]. Resents root disturbance, it is difficult to transplant except when young[11]. The tree does not come into leaf until late May. Plants in this genus are notably resistant to honey fungus[200]. Special Features:Attracts birds, North American native, Wetlands plant, Attracts butterflies, Inconspicuous flowers or blooms.

5.2.461 *Orchis laxiflora*

Marsh Orchis

4 tlin 8 cyuc 2 kcaak 0 tcan 2 dwat 0.8 m hkuc
htut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Orchis laxiflora* is a BULB growing to 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist or wet soil.

kcaakta Edible Parts: RootEdible Uses: DrinkRoot - cooked[2, 4, 46]. It is a source of 'salep', a fine white to yellowish-white powder that is obtained by drying the tuber and grinding it into a powder[2, 105, 177]. Salep is a starch-like substance with a sweetish taste and a faint somewhat unpleasant smell[4]. It is said to be very nutritious and is made into a drink or can be added to cereals and used in making bread etc[100, 183]. One ounce of salep is said to be enough to sustain a person for a day[100, 115].

dwatta Antiflatulent Astringent Cancer Demulcent Expectorant NutritiveUsed in the treatment of cancer[148]. Salep (see above for more details) is very nutritive, astringent, expectorant and demulcent[4, 240]. It has been used

kcaakta Edible Parts: Leaves RootEdible Uses: Young shoots - cooked[105]. They can be used as an asparagus substitute. Root - cooked[105]. Rich in starch.

tcanta Miscellany

dwatta Miscellany TonicEnergizer, tonic. Used to remove freckles[174].

nrakta E. Asia - Japan, Korea. ksacta Woods in hills and low mountains all over Japan[58, 187].

propta Seed - best sown as soon as it is ripe in early autumn in a shady part of a cold greenhouse[200]. Sow stored seed as early in the year as possible. Germination can be slow, they may not come true to type[200] and it takes a few years for them to reach a good size. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a shady position in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in March or October. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Prefers a fertile humus rich moisture retentive well-drained soil in cool shade or semi-shade[200]. Plants are intolerant of heat and drought but tolerate most other conditions[200]. Thrives in dry shade as long as the soil is rich in humus, the plant is also fairly drought tolerant[190]. Requires a mulch protection for the roots in areas where winter temperatures go below -10°C[200]. The rhizomes are shortly-creeping, the plant forming clumps[187]. This species is often grown mistakenly as *P. pulmonum*[200]. *P. humile* is often mistakenly grown as this species[187]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Young shoots are very attractive to slugs[K]. Hybridizes with other members of this genus[200].

5.2.409 *Quercus prinoides*

Dwarf Chinkapin Oak

4 tlin 8 cyuc 2 kcaak 2 tcan 2 dwat 4 m hkuc
hmimhtut cyutli kyuctcup hwicli hyisjlutnyik hpa7tli flatprikliwis hpa7tmwatli hjonli

drutta *Quercus prinoides* is a deciduous Shrub growing to 4 m (13ft 1in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to May, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate strong winds but not maritime exposure.

kcaakta Edible Parts: SeedEdible Uses: CoffeeSeed - cooked[105, 161, 177]. A sweet taste[227]. The seed is up to 15mm long[200], it can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed might contain bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute.

tcanta Repellent TanninThe leaves of most species in this genus are more or less rich in tannins. A mulch of the partially decayed leaves can be placed around vulnerable plants in order to repel slugs, snails, grubs etc, and these will in time break down to add humus and nutrients to the soil. Fresh leaves should be used with caution, however, since as these decay they utilize some of the nitrogen in the soil and thus can inhibit plant growth[20, K]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different

insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff and is also used by many cultures to make ink[4, 331]. The bark of oak trees is also usually rich in tannins and can be used as a dyestuff and for waterproofing rope[331, K]. As a source of wood and lumber the genus *Quercus* is one of the most important of all groups of trees. We have no specific information for this species, but in general he timber is noted for its strength, durability, and beauty, and is used everywhere for innumerable purposes, ranging from fuel to railroad ties, construction of buildings and ships, interior trim, flooring, and all grades of furniture. The woods of different species vary as to their physical qualities; some of them are very hard and tough, others are lighter in weight, softer, and less tough[331]. The wood of many Oak species is a favoured fuel - burning well and giving off a lot of heat[331].

dwatta Astringent DysenteryAny galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta Eastern and Central N. America - Maine to Minnesota, south to Alabama and Texas. ksacta Sunny sites, often in rocky or acid sandy soils[227] on dry plains, rocks, thickets and woodland edges[43].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. Prefers warmer summers than are usually experienced in Britain, trees often grow poorly in this country and fail to properly ripen their wood resulting in frost damage overwinter[200]. Whereas trees in the wild can reach 5 metres or more in height, they rarely exceed 1.5 metres in Britain[11]. Plants produce suckers[11] and often form thickets[229]. The tree flowers on new growth produced in spring, the seed ripening in its first year[200, 229]. Trees produce heavy crops every year or every other year in the wild[229]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. This species is often confused with *Q. michauxii*, *Q. muehlenbergii* and *Q. prinus*[200]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fleshy. Thick or swollen - fibrous or tap root [2-1].

5.2.410 *Orchis mascula*

Early Purple Orchis

4 tlin 8 cyuc 2 kcaak 0 tcan 2 dwat m hkuc
hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatprikliwslip hpa7tmwatli xre7t hjonli

drutta *Orchis mascula* is a BULB growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: RootEdible Uses: DrinkRoot - cooked[2, 4, 46]. It is a source of 'salep', a fine white to yellowish-white powder that is obtained by drying the tuber and grinding it into a powder[2, 105, 177]. Salep is a starch-like substance with a sweetish taste and a faint somewhat unpleasant smell[4]. It is said to be very nutritious and is made into a drink or can be added to cereals and used in making bread etc[100, 183]. One ounce of salep is said to be enough to sustain a person for a day[100, 115].

dwatta Antiflatulent Astringent Demulcent Expectorant NutritiveSalep (see above for more details) is very nutritive, astringent, expectorant and demulcent[4, 240]. It has been used as a diet of special value for children and convalescents, being boiled with water, flavoured and prepared in the same way as arrowroot[4]. Rich in mucilage, it forms a soothing and demulcent jelly that is used in the treatment of irritations of the gastro-intestinal canal[4]. One part of salep to fifty parts of water is sufficient to make a jelly[4]. The tuber, from which salep is prepared, should be harvested as the plant dies down after flowering and setting seed[4].

nrakta Most of Europe, including Britain, to N. Africa, western and northern Asia. ksacta Woodland, copses and open pastures in base rich soils[17].

propta Seed - surface sow, preferably as soon as it is ripe, in the greenhouse and do not allow the compost to dry out. The seed of this species is extremely simple, it has a minute embryo surrounded by a single layer of protective cells. It contains very little food reserves and depends upon a symbiotic relationship with a species of soil-dwelling fungus. The fungal hyphae invade the seed and enter the cells of the embryo. The orchid soon begins to digest the fungal tissue and this acts as a food supply for the plant until it is able to obtain nutrients from decaying material in the soil[200]. It is best to use some of the soil that is growing around established plants in order to introduce the fungus, or to sow the seed around a plant of the same species and allow the seedlings to grow on until they are large enough to move. Division of the tubers as the flowers fade[230]. This species produces a new tuber towards the end of its growing season. If this is removed from the plant as its flowers are fading, the shock to the plant can stimulate new tubers to be formed. The tuber should be treated as being dormant, whilst the remaining plant should be encouraged to continue in growth in order to give it time to produce new tubers[230]. Division can also be carried out when the plant has a fully developed rosette of leaves but before it comes into flower[230]. The entire new growth is removed from the old tuber from which it has arisen and is potted up, the cut being made towards the bottom of the stem but leaving one or two roots still attached to the old tuber. This can often be done without digging up the plant. The old tuber should develop one or two new growths, whilst the new rosette should continue in growth and flower normally[230].

nwatta Succeeds in most soils, but it prefers a moist loam and lots of leaf mould[42]. Requires a deep rich soil[1]. Grows well in full sun or partial shade[42], doing well in a woodland garden[230]. It also succeeds in a sunny dry border or on a scree[230]. Orchids are, in general, shallow-rooting plants of well-drained low-fertility soils. Their symbiotic relationship with a fungus in the soil allows them to obtain sufficient nutrients and be able to compete successfully with other plants. They are very sensitive to the addition of fertilizers or fungicides since these can harm the symbiotic fungus and thus kill the orchid[230]. This symbiotic relationship makes them very difficult to cultivate, though they will sometimes appear uninvited in a garden and will then thrive. Transplanting can damage the relationship and plants might also thrive for a few years and then disappear, suggesting that they might be short-lived perennials[230]. Plants seem to be immune to the predations of rabbits[233]. The flowers have a fairly pleasant odour from a distance, but an unpleasant fur-like smell near to which is more pronounced at night-fall and as the flowers begin to fade[245]. Cultivated plants are very susceptible to the predation of slugs and snails[230]. Plants can succeed in a lawn in various parts of the country. The lawn should not be mown early in the year before or immediately after flowering[200]. Plant out bulbs whilst the plant is dormant, preferably in the autumn[200]. Bulbs can also be transplanted with a large ball of soil around the roots when they are in leaf, they are impatient of root disturbance[1].

5.2.411 *Cirsium palustre*

Marsh Thistle

4 tlin 8 cyuc 2 kcaak 0 tcan 0 dwat 1.5 m hkuc hmimhtut cyutli tucphja7n hwicli hrasjlutnyik hpa7tli flat-prikliwis hpa7tmwatli fyixre7t hjonli

drutta *Cirsium palustre* is a BIENNIAL growing to 1.5 m (5ft) by 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies), beetles. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Leaves Oil StemEdible Uses: Oil-Leaves and young shoots - raw or cooked[52, 100, 183]. Stems - raw or cooked like asparagus or rhubarb[4, 5, 12, 52, 105, 115]. The flower stalks are peeled and eaten raw or cooked[183].

tcanta Oil TinderThe seed fluff is used as a tinder[106]. The seed of all species of thistles yields a good oil by expression[4]. No details of potential yields etc are given[K].

nrakta Europe, including Britain, from Scandinavia south and west to N. Africa and W. Asia ksacta Damp soils in meadows and woodland[5, 17].

propta Seed - sow early spring or autumn in situ. Germination usually takes place within 2 - 8 weeks at 20°C[164].

nwatta An easily grown plant, it succeeds in a sunny position in any ordinary garden soil so long as it is moist[200]. Tolerant of light shade, succeeding in woodlands[17]. A good bee and butterfly plant[17].

5.2.412 *Calystegia sepium*

Hedge Bindweed, Hedge false bindweed, Appalachia false bindweed, Bingham's false bindweed

4 tlin 8 cyuc 2 kcaak 1 tcan 1 dwat 3 m hkuc hmimhtut cyutli tucp hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Calystegia sepium* is a PERENNIAL CLIMBER growing to 3 m (9ft 10in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista This species is said to be purgative[173], some caution is advised.

kcakta Edible Parts: Leaves RootEdible Uses: Stalks and root - cooked[2, 46, 128, 153]. Washed and steamed[179]. A pleasant sweet taste[178]. Rich in starch and sugars, it is very nutritious[179]. It should not be eaten regularly, however, due to its possible purgative effect[179]. Young shoots - cooked[46, 61, 105]. Some caution is advised since they are possibly purgative[179].

tcanta StringThe stems are very flexible and can be used as an emergency string for tying[6]. It is fairly strong but not very long-lasting[K].

dwatta Cholagogue Demulcent Diuretic Febrifuge Poul-tice PurgativeThe root is demulcent, diuretic, febrifuge, poultice and strongly purgative[9, 21, 178, 222]. Use of the root is believed to increase the flow of bile[222].

nrakta Most of Europe, excluding the north but including Britain, W. Asia, N. Africa and N. America. ksacta Hedges, fences, edges of woods, waste ground etc[9].

propta Seed - sow spring in a cold frame in a free draining compost and only just cover. The seed usually germinates in 1 - 3 months at 15°C[138]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in early spring whilst dormant[200].

nwatta Easily grown in ordinary garden soil in a sunny position, but plants are apt to become invasive[1, 200].

ness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to June, and the seeds ripen in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[183]. The fruit is not highly valued[183]. It is delicious[2]. Dry and of no flavour[1, 11]. The fruit is rather on the dry side and has lots of seeds to very little flesh, but the flavour is delicious[K]. The hemispherical fruit is about 15mm in diameter[200].

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

nrakta Western N. America - Colorado, New Mexico and Arizona. ksacta Scrub and rocky slopes in the Rocky mountains[184].

propta Seed - requires stratification and is best sown in early autumn in a cold frame. Stored seed requires one month stratification at about 3°C and is best sown as early as possible in the year. Prick out the seedlings when they are large enough to handle and grow on in a cold frame. Plant them out into their permanent positions in late spring of the following year. Cuttings of half-ripe wood, July/August in a frame[200]. Division in early spring or just before leaf-fall in the autumn[200].

nwatta Easily grown in a good well-drained loamy soil in a sunny position[184]. A very ornamental plant[1, 11], it is hardy to about -20°C[184]. The flowers have a delicious perfume[245]. This species is very closely related to *R. trilobus*[200]. The plant has perennial stems and should not be pruned like normal raspberries[200]. Instead it is sufficient to prune out any dead stems. There are no prickles on the stems[200]. Plants in this genus are notably susceptible to honey fungus[200].

5.2.457 *Orchis coriophora*

Bug Orchis

4 tlin 8 cyuc 2 kcaak 0 tcan 2 dwat 0.3 m hkuc htut cyutli tucp hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Orchis coriophora* is a BULB growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies, beetles. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: DrinkRoot - cooked. It is a source of 'salep', a fine white to yellowish-white powder that is obtained by drying the tuber and grinding it into a powder[2, 105, 177]. Salep is a starch-like substance with a sweetish taste and a faint somewhat unpleasant smell[4]. It is said to be very nutritious and is made into a drink or can be added to cereals and used in making bread etc[100, 183]. One ounce of salep is said to be enough to sustain a person for a day[100, 115].

dwatta Antiflatulent Demulcent NutritiveSalep (see above for more details) is very nutritive and demulcent[4]. It has been used as a diet of special value for children and convalescents, being boiled with water, flavoured and prepared in the same way as arrowroot[4]. Rich in mucilage, it forms a soothing and demulcent jelly that is used in the treatment of irritations of the gastro-intestinal canal[4]. One part of salep to fifty parts of water is sufficient to make a jelly[4]. The tuber, from which salep is prepared, should be harvested as the plant dies down after flowering and setting seed[4].

nrakta C. Europe to W. Asia. ksacta Dry or damp pastures and marshes in hills and mountains[42]. Usually found on acid soils[230].

propta Seed - surface sow, preferably as soon as it is ripe, in the greenhouse and do not allow the compost to dry out. The seed of this species is extremely simple, it has a minute embryo surrounded by a single layer of protective cells. It contains very little food reserves and depends upon a symbiotic relationship with a species of soil-dwelling fungus. The fungal hyphae invade the seed and enter the cells of the embryo. The orchid soon begins to digest the fungal tissue

and this acts as a food supply for the plant until it is able to obtain nutrients from decaying material in the soil[200]. It is best to use some of the soil that is growing around established plants in order to introduce the fungus, or to sow the seed around a plant of the same species and allow the seedlings to grow on until they are large enough to move. Division of the tubers as the flowers fade[230]. This species produces a new tuber towards the end of its growing season. If this is removed from the plant as its flowers are fading, the shock to the plant can stimulate new tubers to be formed. The tuber should be treated as being dormant, whilst the remaining plant should be encouraged to continue in growth in order to give it time to produce new tubers[230]. Division can also be carried out when the plant has a fully developed rosette of leaves but before it comes into flower[230]. The entire new growth is removed from the old tuber from which it has arisen and is potted up, the cut being made towards the bottom of the stem but leaving one or two roots still attached to the old tuber. This can often be done without digging up the plant. The old tuber should develop one or two new growths, whilst the new rosette should continue in growth and flower normally[230].

nwatta Easily grown in full sun in a moist sandy loam[42]. Orchids are, in general, shallow-rooting plants of well-drained low-fertility soils. Their symbiotic relationship with a fungus in the soil allows them to obtain sufficient nutrients and be able to compete successfully with other plants. They are very sensitive to the addition of fertilizers or fungicides since these can harm the symbiotic fungus and thus kill the orchid[230]. This symbiotic relationship makes them very difficult to cultivate, though they will sometimes appear uninvited in a garden and will then thrive. Transplanting can damage the relationship and plants might also thrive for a few years and then disappear, suggesting that they might be short-lived perennials[230]. Plants can succeed in a lawn in various parts of the country. The lawn should not be mown early in the year before or immediately after flowering[200]. Plant out bulbs whilst the plant is dormant, preferably in the autumn[200]. Plants seem to be immune to the predations of rabbits[233]. Cultivated plants are very susceptible to the predation of slugs and snails[230]. The flowers have an abominable bug-like smell[42, 230]. The flowers of the commoner sub-species, *O. coriophora fragrans*, however, are sweetly scented[230].

5.2.458 *Ulmus laciniata*

4 tlin 8 cyuc 2 kcaak 0 tcan 0 dwat 10 m hkuc hmimhtut cyutli tucp hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Ulmus laciniata* is a deciduous Tree growing to 10 m (32ft 10in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to May, and the seeds ripen from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Inner bark LeavesEdible Uses: Leaves - raw or cooked. Inner bark - cooked. It can be dried, ground into a powder and used as a thickening in soups or added to cereal flours when making bread etc[105, 177].

nrakta E. Asia - China, Japan, Korea. ksacta Temperate forests all over Japan[58].

propta Seed - if sown in a cold frame as soon as it is ripe, it usually germinates within a few days[200]. Stored seed does not germinate so well and should be sown in early spring[200]. The seed can also be harvested 'green' (when it has fully developed but before it dries on the tree) and sown immediately in a cold frame. It should germinate very quickly and will produce a larger plant by the end of the growing season[80]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Plants should not be allowed to grow for more than two years in a nursery bed since they form a tap root and will then move badly. Layering of suckers or coppiced shoots[200].

evations of 2000 - 3400 metres[272]. Often found in thickets or forests on slopes at elevations of 1200 - 4000 metres[266].

propta Seed - sow spring or autumn in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame[200]. Cuttings of mature wood of the current season's growth, November to January in a frame. Root cuttings in winter[200]. Layering of young stems in winter[200].

nwatta Requires a good moist well-drained loam, succeeding in full sun if the soil does not dry out otherwise it is best in light shade[11, 200]. Suitable for growing along fences, against walls with wire supports or for growing through other shrubs[200]. Plants climb by means of twining around supports[182]. Flowers are produced on the current years growth[200]. It takes almost 12 months from flowering to ripening the fruit[266].

5.2.454 Berberis verruculosa

4 tlin 8 cyuc 2 kcaak 0 tcan 2 dwat 1.8 m hkuic hmimhtut cyutli tcup hwicli hysrasjlutnyik hpa7tli flatprikliwsslip hpa7tmwatli fyfjxre7t hjonli

drutta Berberis verruculosa is an evergreen Shrub growing to 1.8 m (6ft) by 1.8 m (6ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf all year, in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. Poor quality[K]. The fruits are about 10mm long[200].

tcanta DyePlants can be grown as a medium-size hedge[29]. They are quite tolerant of trimming though are best left untrimmed. They make an effective dense barrier[K]. Plants can be grown as a tall ground cover when planted about 1 metre apart each way[208]. A yellow dye is obtained from the root.

dwatta Antibacterial Cancer DysenteryBerberine, universally present in rhizomes of Berberis species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Licuorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta E. Asia - W. China. ksacta Woods, thickets and rocky places, 1300 - 4100 metres[109].

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78].

nwatta Prefers a warm moist loamy soil and light shade but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. Plants are hardy to about -20°c[184]. Hybridizes freely with other members of this genus[1]. A very ornamental[1] but slow-growing plant[200]. The flowers are sweetly scented[245]. Can be pruned back quite severely, it resprouts well from the base[200].

5.2.455 Beta vulgaris maritima

Sea Beet

4 tlin 8 cyuc 2 kcaak 0 tcan 2 dwat m hkuic htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwsslip hpa7tmwatli xre7t hjonli

drutta Beta vulgaris maritima is a ANNUAL/PERENNIAL growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline and saline soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young leaves - raw or cooked[5, 12, 16, 21]. A delicious spinach substitute in the spring, the leaves become less pleasant as the season progresses, developing a distinct bitterness in hot weather[K]. Some people dislike the raw leaves since they can leave an unpleasant taste in the mouth[K].

dwatta Antitumor EmmenagogueAlthough little used in modern herbalism, beet has a long history of folk use, especially in the treatment of tumours[269]. A decoction prepared from the seed has been used as a remedy for tumours of the intestines. The seed, boiled in water; is said to cure genital tumours[269]. The juice or other parts of the plant is said to help in the treatment of tumours, leukaemia and other forms of cancer such as cancer of the breast, oesophagus, glands, head, intestines, leg, lip, lung, prostate, rectum, spleen, stomach, and uterus[269]. Some figure that betacyanin and anthocyanin are important in the exchange of substances of cancer cells; others note two main components of the amines, choline and its oxidation product betaine, whose absence produces tumours in mice[269]. The juice has been applied to ulcers[269]. A decoction is used as a purgative by those who suffer from haemorrhoids in South Africa[269]. Leaves and roots used as an emmenagogue[269]. Plant effective in the treatment of feline ascariasis[269]. In the old days, beet juice was recommended as a remedy for anaemia and yellow jaundice, and, put into the nostrils to purge the head, clear ringing ears, and alleviate toothache[269]. Beet juice in vinegar was said to rid the scalp of dandruff as scurf, and was recommended to prevent falling hair[269]. Juice of the white beet was said to clear obstructions of the liver and spleen[269]. Culpepper (1653) recommended it for treating headache and vertigo as well as all affections of the brain[269].

nrakta Coastal areas of Europe, including Britain, south and east to N. Africa and Asia to the East Indies. ksacta Banks and shingle by the coast[5].

propta Seed - sow March to May in situ.

nwatta Beets grow well in a variety of soils, growing best in a deep, friable well-drained soil abundant with organic matter, but doing poorly on clay. They prefer an open position and a light well-drained soil[52]. The optimum pH is 6.0 - 6.8, but neutral and alkaline soils are tolerated in some areas. Some salinity may be tolerated after the seedling stage. Beets are notable for their tolerance to manganese toxicity. Beet is reported to tolerate an annual precipitation of 23 to 315cm, an average annual temperature range of 5.0 to 26.6°C and a pH of 4.2 to 8.2[269]. This is the wild beet-root of coastal areas. The cultivated beetroot, sugar beet, seakale beet and Swiss chard have all been developed from this species by means of selective breeding[1, 5]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

5.2.456 Rubus deliciosus

Rocky Mountain Raspberry, Delicious raspberrry

4 tlin 8 cyuc 2 kcaak 0 tcan 0 dwat 3 m hkuic htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwsslip hpa7tmwatli xre7t hjonli

drutta Rubus deliciosus is a deciduous Shrub growing to 3 m (9ft 10in) at a medium rate. See above for USDA hardi-

Hedge bindweed is a troublesome garden weed, especially when growing on moist soils[1, 4]. The plant is a vigorous climber with annual shoots 3 metres or more long. These twine around other plants and can kill them by smothering them[4]. Once established, it is very difficult to eradicate the plant because it has very deep roots and is capable of re-growing from any part of the root left in the ground. The flowers open in sunny weather and remain closed during dull weather[4]. Nearly all taxa in Calystegia intergrade geographically into neighboring taxa with the exception of the widespread coastal species, *C. soldanella* (Linnaeus) R. Brown. It is impossible to draw clearly defined specific limits, and intermediate forms are always found where two taxa approximate geographically[266].

5.2.413 Malus x soulardii

4 tlin 8 cyuc 2 kcaak 0 tcan 0 dwat 5 m hkuic hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwsslip hpa7tmwatli xre7t hjonli

drutta Malus x soulardii is a deciduous Shrub growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[200]. Fairly large, the fruit is up to 5cm in diameter[200].

nrakta A hybrid of garden origin, probably *M. ioensis* x *M. pumila*[200]. ksacta Not known in the wild.

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

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[1, 200]. The fruit is a good wildlife food source, especially for birds[200]. Hybridizes freely with other members of this genus[200]. There are several named varieties selected for their ornamental value[200]. ‘Wynema’ has large edible fruits up to 5cm in diameter. It has a biennial bearing habit[200]. Plants in this genus are notably susceptible to honey fungus[200].

5.2.414 Carlina acaulis

Stemless Carline Thistle

4 tlin 8 cyuc 2 kcaak 0 tcan 2 dwat 0.2 m hkuic htut cyutli kyuctup hwicli hysrasjlutnyik hpa7tli flatprikliwsslip hpa7tmwatli fyfjxre7t hjonli

drutta Carlina acaulis is a BIENNIAL/PERENNIAL growing to 0.2 m (0ft 8in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in

June, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: Flowers Root StemEdible Uses: Flowering head - cooked. Used as a globe artichoke substitute[177, 183], though they are considerably smaller and even more fiddly[K]. The fleshy centre of the plant is edible[7, 105]. Does this refer to the peeled stem?[K]. Root[13]. No more details are given.

tcanta Weather forecastingThe dried flowers respond to the amount of humidity in the air and can be used as hygrometers[100]. Flowers on the growing plant close at the approach of rain[268].

dwatta Antispasmodic Carminative Diaphoretic Digestive Diuretic Eczema Emetic Febrifuge PurgativeStemless carline thistle is seldom used in modern herbalism. The plant was at one time in great demand as an aphrodisiac[7], it is occasionally used nowadays in the treatment of spasms of the digestive tract, gall bladder and liver disorders, dropsy, urine retention etc[9, 268]. The root has also been used in treating a range of skin complaints such as acne and eczema[268]. A decoction of the root can be used externally to cleanse wounds or as an antiseptic gargle[268]. Some caution should be employed since in large doses the root is purgative and emetic[268]. The root is antibiotic, antispasmodic, carminative, diaphoretic, digestive, mildly diuretic, emetic in large doses, febrifuge and purgative in large doses[7, 9, 21, 46]. The root is harvested in the autumn and dried for later use[7].

nrakta Europe. ksacta Poor soils in dry sandy pastures and on rocky slopes[7, 21, 100], especially on limestone[9].

propta Seed - surface sow in a cold frame in the spring. The seed usually germinates in 4 - 8 weeks at 15°c[138]. As soon as they are large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in the summer.

nwatta Succeeds in a sunny position in ordinary garden soil[111]. Prefers a neutral to alkaline soil[138, 238]. Prefers a poor soil[200]. Established plants are drought tolerant[190]. Plants are hardy to about -20°c[187]. The stemless carline thistle is a protected plant in the wild because of its rarity[7]. This species resents root disturbance, it should be planted into its final position as soon as possible[138]. Plants are usually short-lived or monocarpic[187]. The plant is popular in dried flower arranging, the dried heads keeping their appearance indefinitely[7].

5.2.415 Sorbus intermedia

Swedish Whitebeam

4 tlin 8 cyuc 2 kcaak 0 tcan 0 dwat 12 m hkuic hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatprikliwsslip hpa7tmwatli fyfjxre7t hjonli

drutta Sorbus intermedia is a deciduous Tree growing to 12 m (39ft) by 12 m (39ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects, Apomictic (reproduce by seeds formed without sexual fusion). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure. It can tolerate atmospheric pollution.

pcista The seeds probably contain hydrogen cyanide. This is the ingredient that gives almonds their characteristic flavour. Unless the seed is very bitter it should be perfectly safe in reasonable quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 3]. A mild, though slightly bitter flavour with a mealy texture[K]. The fruit is up to 13mm across[200] and is produced in quite large clusters, making harvesting easier[K].

tcanta Hedge Hedge ShelterbeltResistant to maritime exposure, this tree can be used as a part of a shelterbelt planting[75, 200]. If regularly trimmed it can be used as a dense deciduous hedge[200].

nrakta Europe. Freely naturalized in some areas of Britain[17]. Possibly of hybrid origin. ksacta Not known

propta Seed - best sown as soon as it is ripe in a cold frame[78, 80]. If you have sufficient seed it can be sown in an outdoor seedbed[78, 80]. Stored seed germinates better if given 2 weeks warm then 14 - 16 weeks cold stratification[98], so sow it as early in the year as possible. Prick out the seedlings into individual pots when they are large enough to handle. Seedlings are very slow to put on top-growth for their first year or two[11], but they are busy building up a good root system. It is best to keep them in pots in a cold frame for their first winter and then plant them out into their permanent positions in late spring.

nwatta Succeeds in most reasonably good well-drained soils in an open sunny position[11]. Tolerates very acid or alkaline soils[200] and light shade[188], though it fruits better in a sunny position[K]. Suitable for very exposed sites, including maritime exposure[75, 200]. Tolerates atmospheric pollution[11, 200]. Resistant to firehlight[11]. The trees usually have apomictic flowers. They thus produce seed asexually, each seedling being a clone of the parent[11]. The fruits are very attractive to birds[11].

5.2.416 Polygonatum humile

4 tlin 8 cyuc 2 kcaak 0 tcan 1 dwat 0.3 m hkuc pcmhmtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikkwis hpa7tmwatli fyfkr7t hjonli

drutta Polygonatum humile is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to June, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

pcista Although no reports of toxicity have been seen for this species, some members of this genus are believed to have poisonous fruits and seeds.

kcakta Edible Parts: Leaves RootEdible Uses: Young shoots - cooked. They can be used as an asparagus substitute. Root - cooked[105]. Rich in starch.

dwatta Antiperiodic Antirheumatic Demulcent Refrigerant Sedative Sialagogue TonicThe roots are antiperiodic, antirheumatic, demulcent, refrigerant, sedative, sialagogue and tonic[218].

nrakta E. Asia - N. China, Japan, Korea. ksacta Meadows and thin woods in lowland, C. and N. Japan[58]. Forests and grassy slopes at elevations from 800 - 2200 metres[266].

propta Seed - best sown as soon as it is ripe in early autumn in a shady part of a cold greenhouse[200]. Sow stored seed as early in the year as possible. Germination can be slow, they may not come true to type[200] and it takes a few years for them to reach a good size. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a shady position in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in March or October. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Prefers a fertile humus rich moisture retentive well-drained soil in cool shade or semi-shade[200]. Plants are intolerant of heat and drought but tolerate most other conditions[200]. This species is hardy to about -20°C[187]. Closely related to *P. hirtum*[200]. Closely allied to *P. odoratum*. Plants are often mistakenly grown as *P. falcatum*[187].

The rhizomes are slender and creeping, the plant forming spreading colonies[187]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Young shoots are very attractive to slugs. Hybridizes with other members of this genus[200].

5.2.417 Malus x micromalus

Kaido Crab Apple

4 tlin 8 cyuc 2 kcaak 0 tcan 0 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikkwis hpa7tmwatli xre7t hjonli

drutta Malus x micromalus is a deciduous Shrub growing to 4 m (13ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[183]. About 15mm in diameter[200].

tcanta RootstockUsed as a rootstock for the cultivated apple, *M. sylvestris domestica*, it is said to be the best dwarfing rootstock from seed[183].

nrakta A hybrid of garden origin, *M. baccata* x *M. spectabilis*[200]. ksacta Not known in the wild.

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

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[1, 200]. The fruit is a good wildlife food source, especially for birds[200]. Hybridizes freely with other members of this genus[200]. Plants in this genus are notably susceptible to honey fungus[200].

5.2.418 Arabis caucasica

Rock Cross, Wall Rockcross

4 tlin 9 cyuc 2 kcaak 3 tcan 0 dwat 0.2 m hkuc hmimhtut cyutli hgatyuctcup hwicli hyishrasjlutnyik hpa7tli flatprikkwis hpa7tmwatli xre7t hjonli

drutta Arabis caucasica is an evergreen Perennial growing to 0.2 m (0ft 8in) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in leaf all year, in flower from January to May, and the seeds ripen from April to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic

visited by pollinating insects. Self-fertilization is the usual method of reproduction, though cross-fertilization by insects does sometimes occur[4]. The plant also produces cleistogamous flowers - these never open and therefore are always self-fertilized[4]. The plant is very variable according to habitat and is seen by most botanists as part of an aggregate species of 4 very variable species, viz. - *P. aviculare*. L.; *P. boreale*. (Lange.) Small.; *P. rivivacuum*. Jord. ex Box.; and *P. arenastrum*. Bor[17].

5.2.450 Equisetum pratense

Meadow Horsetail

4 tlin 8 cyuc 2 kcaak 2 tcan 2 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikkwis hpa7tmwatli hjonli

drutta Equisetum pratense is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5. The seeds ripen in April. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Large quantities of the plant can be toxic. This is because it contains the enzyme thiaminase[172], a substance that can rob the body of the vitamin B complex[65]. In small quantities this enzyme will do no harm to people eating an adequate diet that is rich in vitamin B, though large quantities can cause severe health problems. The enzyme is destroyed by heat or thorough drying, so cooking the plant will remove the thiaminase[172]. The plant also contains equisetin acid - see the notes on medicinal uses for more information[213].

kcakta Edible Parts: RootEdible Uses: Roots - raw or cooked[46, 61, 85, 161, 257]. Caution is advised, see the notes above on toxicity. A further report says that the peeled stems, base of the plant, root and tubers were eaten raw by the N. American Indians, the report went on to say that this may be inadvisable[85].

tcanta Dynamic accumulator.

dwatta Horsetails have an unusual chemistry compared to most other plants[238]. They are rich in silica, contain several alkaloids (including nicotine) and various minerals[238].

nrakta Arctic and temperate regions of Europe, including Britain, N. America, central and northern Asia. ksacta Grassy stream banks, up to 900 metres[17]

propta Spores - best collected as soon as they are ripe in the spring and surface-sown immediately on a sterile compost. Keep moist and pot up as soon as the plants are large enough to handle. Very difficult[200]. Division. The plants usually spread very freely when well sited and should not really need any assistance.

nwatta Prefers a moist soil with a pH between 6.5 and 7.5[200]. Plants are hardy to about -30°C[200]. Plants have a deep and penetrating root system and can be invasive. If grown in the garden they are best kept in bounds by planting them in a large container which can be sunk into the ground[200].

5.2.451 Cardamine fauriei

4 tlin 8 cyuc 2 kcaak 0 tcan 0 dwat 0.3 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatprikkwis hpa7tmwatli fyfkr7t hjonli

drutta Cardamine fauriei is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to August, and the seeds ripen from May to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: Leaves RootEdible Uses: Leaves - raw[105, 177]. Added to salads. A hot, watercress flavour. Root[105, 177]. No further details are given.

nrakta E. Asia - N. Japan. ksacta Streams and ravines in mountains[58].

propta Seed - sow spring in a cold frame. Germination usually takes place within 1 - 3 weeks at 15°C[175]. When

large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in a greenhouse or cold frame for the first two years, planting them out when dormant in late summer. Division in early spring or after the plant dies down in the summer. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta We have very little information on this species and do not know if it will be hardy in Britain, though judging by its native range it should succeed outdoors in most parts of this country. The following notes are based on the general needs of the genus. Prefers a moist humus rich soil in shade or semi-shade[200] but succeeds in most soils that are not dry[1].

5.2.452 Angelica gigas

Giant Angelica, Purple Parsnip, Korean Angelica

4 tlin 8 cyuc 2 kcaak 0 tcan 2 dwat 1.8 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikkwis hpa7tmwatli fyfkr7t hjonli

drutta Angelica gigas is a PERENNIAL growing to 1.8 m (6ft) at a medium rate. It is not frost tender. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All members of this genus contain furcoumarins, which increase skin sensitivity to sunlight and may cause dermatitis[238].

kcakta Edible Parts: LeavesEdible Uses: Young leaves - cooked[177, 183].

dwatta Blood tonic Women's complaintsThe root is used in Korea to treat anaemia, hemiplegia and women's diseases[279]. It contains a number of active compounds and has been shown to increase duodenum motility and have an anti-platelet aggregation action[279].

nrakta E. Asia - China, Japan. ksacta Grassy places and open woods in the mountains[187]. In grasses, forests or by stream at elevations around 1000 metres[266].

propta Seed - best sown in a cold frame as soon as it is ripe since the seed only has a short viability[200]. Seed can also be sown in the spring, though germination rates will be lower. It requires light for germination[200]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter, planting them out into their permanent positions in the spring. The seed can also be sown in situ as soon as it is ripe.

nwatta Landscape Uses:Specimen, Woodland garden. Requires a deep moist fertile soil in dappled shade or full sun[200]. Hardy to about -20°C[187]. Plants flower in 2 years from seed[187] and are reliably perennial if prevented from setting seed[200]. Special Features: Attractive foliage, Naturalizing.

5.2.453 Berchemia flavescens

4 tlin 8 cyuc 2 kcaak 0 tcan 0 dwat 5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikkwis hpa7tmwatli xre7t hjonli

drutta Berchemia flavescens is a deciduous Climber growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to August, and the seeds ripen from May to July. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - eaten raw when fully ripe[272]. The sausage-shaped fruit is about 12mm long[11].

nrakta E. Asia - Himalayas in India, Nepal, Sikkim, Tibet and Bhutan. ksacta Wet shaded places in forested areas at el-

permanent positions in late spring or early summer, after the last expected frosts. Plants should not be allowed to grow for more than two years in a nursery bed since they form a tap root and will then move badly. Layering of suckers or coppiced shoots[200].

nwatta Agroforestry Services: Windbreak Fodder: Bank Industrial Crop: Biomass Management: Coppice Management: Standard Minor Global CropLandscape Uses:Firewood, Aggressive surface roots possible. Prefers a fertile soil in full sun[188], but is easily grown in any soil of at least moderate quality so long as it is well drained[1]. Succeeds in a hot dry position[200]. Established plants are drought resistant[11, 200]. Fairly wind-tolerant[200]. This species, or at least some of its cultivars[200], is resistant to 'Dutch elm disease', a disease that has destroyed the greater part of all the elm trees growing in Britain. The disease is spread by means of beetles. There is no effective cure (1992) for the problem, but most E. Asian, though not Himalayan, species are resistant (though not immune) to the disease so the potential exists to use these resistant species to develop new resistant hybrids with the native species[200]. The various species of this genus hybridize freely with each other and pollen is easily saved, so even those species with different flowering times can be hybridized[200]. Special Features:Not North American native, Invasive, Naturalizing, Inconspicuous flowers or blooms.

5.2.448 Cardamine bulbosa

Bulbous Bittercress

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 0.5 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Cardamine bulbosa is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to August, and the seeds ripen from May to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: LeavesEdible Uses: CondimentLeaves - raw[105, 177]. Added to salads. The rootstock is grated and used as a condiment[207], it is a horse radish substitute[105, 177]. A hot pungent taste.

nrakta Eastern N. America - Vermont to Ontario and Minnesota, south to Florida and Texas. ksacta By springs, bottomland woods and meadows[43].

propta Seed - sow outdoors in a seedbed in a shady position in April. Plant out in autumn or spring. Division in spring. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the summer or following spring.

nwatta We have very little information on this species and do not know if it will be hardy in Britain, though judging by its native range it should succeed outdoors in many parts of this country. The following notes are based on the general needs of the genus. Prefers a moist humus rich soil in shade or semi-shade[200] but succeeds in most soils that are not dry[1]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is tuberous with swollen potato-like roots [1-2].

5.2.449 Polygonum arenastrum

Small-Leaved Knotweed, Oval-leaf knotweed

4 tlin 8 cyuc 2 kcak 0 tcan 3 dwat 0.3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Polygonum arenastrum is a ANNUAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to October, and the seeds ripen from August to October. The species is hermaphrodite

(has both male and female organs) and is pollinated by Insects. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

pcista Although no specific mention has been made for this species, there have been reports that some members of this genus can cause photosensitivity in susceptible people. Many species also contain oxalic acid (the distinctive lemony flavour of sorrel) - whilst not toxic this substance can bind up other minerals making them unavailable to the body and leading to mineral deficiency. Having said that, a number of common foods such as sorrel and rhubarb contain oxalic acid and the leaves of most members of this genus are nutritious and beneficial to eat in moderate quantities. Cooking the leaves will reduce their content of oxalic acid. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Young leaves and plants - raw or cooked[105, 177]. Used as a potherb[183], they are very rich in zinc[179]. A nutritional analysis is available[218]. Seed - raw or cooked. Rather small and fiddly to utilize, they can be used in all the ways that buckwheat (Fagopyrum esculentum) is used, either whole or dried and ground into a powder for use in pancakes, biscuits and piñole[4, 55, 106, 161, 183]. The leaves are a tea substitute[183].

tcanta Yields a blue dye that is not much inferior to indigo[115]. The part used is not specified, but it is likely to be the leaves. Yellow and green dyes are obtained from the whole plant[168]. The roots contain tannins, but the quantity was not given[223].

dwatta DysenteryKnotweed is a safe and effective astringent and diuretic herb that is used mainly in the treatment of complaints such as dysentery and haemorrhoids. It is also taken in the treatment of pulmonary complaints because the silicic acid it contains strengthens connective tissue in the lungs[254]. The whole plant is anthelmintic, astringent, cardiotoxic, cholagogue, diuretic, febrifuge, haemostatic, lithontripic and vulnerary[4, 7, 9, 21, 53, 147, 172, 176, 178]. It was formerly widely used as an astringent both internally and externally in the treatment of wounds, bleeding, piles and diarrhoea[4]. Its diuretic properties make it useful in removing stones[4]. An alcohol-based preparation has been used with success to treat varicose veins of recent origin[7]. The plant is harvested in the summer and early autumn and is dried for later use[9]. The leaves are anthelmintic, diuretic and emollient[218]. The whole plant is anthelmintic, antiplogistic and diuretic[218]. The juice of the plant is weakly diuretic, expectorant and vasoconstrictor[218]. Applied externally, it is an excellent remedy to stay bleeding of the nose and to treat sores[4]. The seeds are emetic and purgative[4, 240]. Recent research has shown that the plant is a useful medicine for bacterial dysentery. Of 108 people with this disease, 104 recovered within 5 days when treated internally with a paste of knotweed[254].

nrakta Throughout Europe, including Britain. ksacta Waste places and roadsides, common throughout Britain[17].

propta Seed - sow spring in a cold frame. Germination is usually free and easy. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer if they have reached sufficient size. If not, overwinter them in a cold frame and plant them out the following spring after the last expected frosts. Division in spring or autumn. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Succeeds in an ordinary garden soil[1] but prefers a moisture retentive not too fertile soil in sun or part shade[200]. Repays generous treatment, in good soils the plant will cover an area up to a metre in diameter[1, 4]. Prefers an acid soil[20]. Dislikes shade. Knotweed is a common and invasive weed of cultivated ground[7]. It is an important food plant for the caterpillars of many species of butterflies[30]. It also produces an abundance of seeds and these are a favourite food for many species of birds[4]. Plants seem to be immune to the predations of rabbits[233]. The flowers have little or no scent or honey and are rarely

(mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: LeavesEdible Uses: The leaves are used as a garnish in much the same way as watercress[183]. They are also sometimes used as a potherb[183].

tcanta A good ground cover plant for sunny positions[188, 197], forming a carpet[208].

nrakta S.E. Europe - Mediterranean. Occasionally naturalized in Britain[17]. ksacta Mountain rocks and dry sites[45].

propta Seed - it is best to surface sow the seed as soon as it is ripe in a light position in a cold frame[134]. Seed can also be sown in spring. It usually germinates in 2 - 3 weeks at 21°c[134]. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division after flowering[111]. Very easy, the divisions can be planted out straight into their permanent positions if required. Cuttings in a shady border in summer[1].

nwatta Landscape Uses:Alpine garden, Border, Ground cover, Rock garden. Easily grown in ordinary well-drained soil[1]. Prefers a poor soil[187]. Succeeds in partial shade[134] though it tends to become straggly[197]. Established plants are very tolerant of drought and grow very well on a dry bank[190], they also succeed when grown in walls[219, K]. A very ornamental plant[1], it is hardy to about -15°c[187], but can be rather invasive[200]. There are some named varieties selected for their ornamental value[187]. A good butterfly and moth plant[30]. Bees are attracted to the flowers. Plants resent root disturbance and are best put in their final positions whilst still small[134]. This species is closely related to A. alpina[200]. Special Features: Attractive foliage. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2].

5.2.419 Prunus buergeriana

4 tlin 8 cyuc 2 kcak 0 tcan 1 dwat 9 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Prunus buergeriana is a deciduous Tree growing to 9 m (29ft 6in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to May, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: Fruit SeedEdible Uses: Fruit - raw or cooked. The fruit is small, about 5mm in diameter[266], and of inferior quality, though it is sometimes gathered and pickled in salt then used as a condiment or appetizer[2, 177]. It contains a single large seed. Seed - raw or cooked. It is

usually salted in the Orient[177]. Do not eat the seed if it is too bitter - see the notes above on toxicity.

tcanta DyeA green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168].

dwatta Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta E. Asia - China, Japan, Korea. ksacta Hillsides and mountains in C. and S. Japan[58]. Dense forests on slopes, along trails and sunny places on slopes at elevations of 1000 - 3400 metres[266].

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200]. Softwood cuttings from strongly growing plants in spring to early summer in a frame[200]. Layering in spring.

nwatta Thrives in a well-drained moisture-retentive loamy soil[11, 200]. Prefers some lime in the soil but is likely to become chlorotic if too much lime is present[1]. Succeeds in sun or partial shade though it fruits better in a sunny position[11, 200]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. Plants in this genus are notably susceptible to honey fungus[200].

5.2.420 Polygonatum verticillatum

Whorled Solomon's Seal

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 1.2 m hkuc pcmhmim cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Polygonatum verticillatum is a PERENNIAL growing to 1.2 m (4ft) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

pcista Although no reports of toxicity have been seen for this species, some members of this genus have poisonous fruits and seeds.

kcakta Edible Parts: Leaves RootEdible Uses: Tender leaves and young shoots - cooked as a vegetable[51, 272]. They can be used as an asparagus substitute. Root - cooked[105]. Rich in starch.

nrakta Europe, including Britain, from Scandinavia south and east to Spain, W. Asia, Himalayas. ksacta Margins of woods, clearings and shady rocky places, usually on acid soils[17].

propta Seed - best sown as soon as it is ripe in early autumn in a shady part of a cold greenhouse[200]. Sow stored seed as early in the year as possible. Germination can be slow, they may not come true to type[200] and it takes a few years for them to reach a good size. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a shady position in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in March or October. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Prefers a fertile humus rich moisture retentive well-drained soil in cool shade or semi-shade[200]. Plants are

intolerant of heat and drought but tolerate most other conditions[200]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. The young shoots are very attractive to slugs[K]. Hybridizes with other members of this genus[200].

5.2.421 Smilax glauca

Cat Greenbrier

4 tlin 8 cyuc 2 kcaak 0 tcan 2 dwat 5 m hkuc hmimhtut cyutli kyuctucp hwicli hrasjlutnyik hpa7tli flatprikliws hpa7tmwatli nyanhjen hjonli

drutta Smilax glauca is an evergreen Climber growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 4. It is in leaf all year, in flower in June. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). . The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Leaves RootEdible Uses: Root - cooked[161, 257]. It can be boiled and made into a jelly or dried and ground into a powder then used with cereals when making bread etc[61, 105, 159]. Young shoots in spring - raw or cooked[159].

dwatta Birthing aid Poultice RubefacientThe stem prickles have been rubbed on the skin as a counter-irritant to relieve localised pains, muscle cramps and twitching[222]. A tea made from the leaves and stems has been used in the treatment of rheumatism and stomach problems[222]. The wilted leaves are applied as a poultice to boils[222, 257]. A tea made from the roots is used to help the expelling of afterbirth[222]. Reports that the roots contain the hormone testosterone have not been confirmed, they might contain steroid precursors, however[222].

nrakta South-eastern N. America - New England to Florida, west to Texas and Indiana. ksacta Dry to moist sandy thickets, open woods and fields[43]. Dry to wet woods, thickets, hedge- rows, roadsides from sea level to 800 metres[270].

propta Seed - sow March in a warm greenhouse[1]. This note probably refers to the tropical members of the genus, seeds of plants from cooler areas seem to require a period of cold stratification, some species taking 2 or more years to germinate[K]. We sow the seed of temperate species in a cold frame as soon as we receive it, and would sow the seed as soon as it is ripe if we could obtain it then[K]. When the seedlings eventually germinate, prick them out into individual pots when they are large enough to handle and grow them on in the greenhouse for at least their first year, though we normally grow them on in pots for 2 years. Plant them out into their permanent positions in early summer. Division in early spring as new growth begins[238]. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer. Cuttings of half-ripe shoots, July in a frame[238].

nwatta Succeeds in moist soils in sun or semi-shade[200]. Hardy to at least -20°c[200]. A vigorous plant, it can be grown through trees or shrubs or over tree stumps[200]. Dioecious. Male and female plants must be grown if seed is required.

5.2.422 Kalopanax septemlobus

Tree Aralia, Castor aralia

4 tlin 8 cyuc 2 kcaak 0 tcan 1 dwat 25 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliws hpa7tmwatli xre7t hjonli

drutta Kalopanax septemlobus is a deciduous Tree growing to 25 m (82ft 0in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from August to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young leaves and young shoots - cooked[177, 179].

tcanta InsecticideThe bark and the leaves are used as an insecticide[178]. Wood[266].

dwatta Antifungal Expectorant Hepatic Skin Stomachic-The bark contains a range of bio-active constituents, including saponins, flavonoids and lignans[279]. It has antifungal and liver protecting properties[279]. It is used in Korea in the treatment of contusions, beri-beri, lumbago, neuralgia and pleurisy[279]. An infusion of the leaves is used to make a stomachic tea[218]. The root is expectorant[218]. A decoction of the wood is used for skin diseases[178, 218].

nrakta E. Asia - China, Japan. ksacta Cool deciduous forests from near sea level to elevations of 2500 metres[11, 200, 266].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame[200]. Stored seed probably requires a period of cold stratification and should be sown as soon as possible. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame[200]. Root cuttings in late winter.

nwatta Requires a deep fertile moisture-retentive soil in sun or part shade[200]. Young shoots, especially on young plants, can die back over winter if they are not fully ripened[11]. Young plants are slow-growing[200]. The tree is widely cultivated for timber in China[266]. A polymorphic species[11].

5.2.423 Potentilla egedei

Pacific Silverweed

4 tlin 8 cyuc 2 kcaak 0 tcan 1 dwat 0.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliws hpa7tmwatli fyixre7t hjonli

drutta Potentilla egedei is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 4. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: RootEdible Uses: Root - raw or cooked[118, 172, 257]. The raw root has a bitter flavour but most of the bitterness is lost once the root is cooked and the flavour then becomes somewhat like a sweet potato[256]. The roots are rather thin but were a staple food of some North American Indian tribes[256].

dwatta Astringent Ophthalmic PoulticeThe whole plant is astringent[172]. A poultice of the boiled roots and oil can be applied to sores and swellings[257]. The juice from the roots has been used as a wash for sore eyes[257].

nrakta E. Asia. Western N. America - Alaska to California. . ksacta Coastal dunes, beaches, sand flats, marsh edges and streambanks, occasionally inland, from Alaska to California[60].

propta Seed - sow early spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Easily grown in a well-drained loam, preferring a position in full sun but tolerating shade[1]. Prefers an alkaline soil but tolerates a slightly acid soil[200]. Members of this genus are rarely if ever troubled by browsing deer[233]. This species is closely related to *P. anserina*[43, 200].

and powdered mixture of several herbs that can be added to a compost heap in order to speed up bacterial activity and thus shorten the time needed to make the compost[K]. The whole plant was formerly used as a strewing herb[4, 168]. The whole plant is insect repellent both when growing and when dried[14, 20]. An essential oil from the whole plant is used as a flavouring and in perfumery[46]. Yellow to gold dyes are obtained from the flowers[168]. The plant makes a very good ground cover[197] and can also be used as an edging plant[200]. It does tend to become bare in patches[208]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Anodyne Antianxiety Antinflammatory Antispasmodic Aromatherapy Nervine Stomachic Tonic Vasodilator-Camomile is a common herb with a long history of safe and effective medicinal use - it is widely used as a household herbal remedy. It is particularly useful as a remedy for various problems of the digestive system, as a sedative and a nerve, it is especially suited for young children[4, 20, 21]. A tea is made from the flowers and this should be prepared in a closed vessel to prevent loss of the essential oils[4]. The flowers are anodyne, anti-inflammatory, antispasmodic, nervine, stomachic, tonic, vasodilator[4, 14, 21, 37, 165, 201]. The single-flowered form is the most potent medicinally, though it can in large doses damage the lining of the stomach and bowels[4]. For this reason, the double-flowered form is usually preferred since this contains less of the alkaloid that causes the problem[4]. The flowers are gathered in the summer when they are fully open and are distilled for their oil or dried for later use[238]. They should not be stored for longer than 12 months[238]. The whole herb is used to make a lotion for external application in the treatment of toothache, earache, neuralgia etc[4]. The essential oil is used in aromatherapy. Its keyword is 'Soothing'[210]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve *Chamaemelum nobile* for coughs and bronchitis, fevers and colds, inflammations of the skin, inflammation of the mouth and pharynx, tendency to infection - improve immunity, wounds and burns (see [302] for critics of commission E).

nrakta Western Europe, including Britain, from Belgium south to N. Africa and the Azores. ksacta Sandy commons, pastures and grassy roadsides[17].

propta Seed - sow March in a cold frame. Only just cover the seed and do not let the compost dry out. When they are large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in the summer. Division in spring or autumn. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the summer or following spring. Basal cuttings in spring. Harvest the shoots when they are about 5cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Tolerates most well-drained soils, preferring a dry sandy soil and a sunny position[4, 37, 200]. Tolerates partial shade[16]. Established plants are drought tolerant[190]. Can be grown in grass[54]. Tolerates a pH in the range of 6.8 to 8. Plants are hardy to at least -15°c[200]. They often deteriorate in very wet or cold winters, but usually recover quickly in the spring and early summer[238]. Chamomile is commonly grown in the domestic herb garden, it is also cultivated commercially for its flowers which are used in herb teas and medicinally. The double-flowered form is highly regarded for its medicinal virtues[165]. Plants can be invasive when growing in good conditions[188], though they are easy to control[K]. There is some confusion between this plant (which is a perennial) and the annual chamomile (*Matricaria chamomilla*) as to which is the genuine medicinal chamomile. Some reports say that this plant is the most effective herbally[4], whilst others say that *Matricaria* is more potent[9]. Both plants seem to have very similar properties and either can probably be used quite successfully. Camomile is a very good companion plant, promoting the health of plants it is growing close to, it is especially good for growing near cabbages, onions and, in small quantities, wheat[4, 14, 20, 54, 201, 238]. The cultivar 'Treneague' is a low-growing non-flowering form that makes an excellent

ground cover[197]. Fairly tolerant of being walked on, it is sometimes used instead of grass for making a lawn though it is more difficult to maintain and can become weed-infested, especially in its early stages[200]. It also tends to become bare in places[208]. The whole plant has a pungent aroma, this being especially noticeable on hot days or when the plant is bruised. Suitable for temperate areas; in subtropical areas, it requires partial shade and will be short-lived; it is unlikely to grow in tropical areas. The plant is heat tolerant in zones 9 through 6. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A clumping mat former. Forming a dense prostrate carpet with a limited spread [1-2]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is suckering with new plants from runners away from the plant [2-1].

5.2.447 Ulmus pumila

Siberian Elm, Hybrid elm

4 tlin 9 cyuc 2 kcaak 0 tcan 2 dwat 15 m hkuc hmimhtut cyutli hgtaklyuctucp hwicli hrasjlutnyik hpa7tli flatprikliws hpa7tmwatli xre7t hjonli

drutta Ulmus pumila is a deciduous Tree growing to 15 m (49ft) by 12 m (39ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower in April, and the seeds ripen in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure.

kcakta Edible Parts: Fruit Inner bark LeavesEdible Uses: Leaves - raw or cooked[105, 177, 183]. Used as a potherb[218]. Inner bark - cooked. It can be dried and made into noodles[105, 177, 183]. The dried inner bark can also be ground into a powder and then used as a thickener in soups or added to cereal flours when making bread etc. Fruit - raw or cooked[105, 177]. Used when immature, it can be made into a sauce and a wine[183]. The fruit is about 10mm in diameter[200].

tcanta Fibre Fodder Shelterbelt WoodA coarse cloth is made from the inner bark[149]. A fairly wind resistant tree, it can be grown as part of a shelterbelt planting[200]. Wood - hard, heavy, tough, difficult to split. Used for agricultural implements, boat making etc[149].

dwatta Antibilious Antidote Demulcent Diuretic Febrifuge Lenitive Lithontrpic PoulticeThe leaves are diuretic and febrifuge[218]. They are used as a pot herb and are then said to be antibilious, antidote and lithontrpic[218]. The stem bark is demulcent, diuretic, febrifuge and lenitive[218]. It is mixed with oil and vinegar then used as a poultice on abscesses, mastitis and swellings[218].

nrakta E. Asia - China, E. Siberia, Turkestan. ksacta Dry sandy or stony soils, pebbles of river valleys, slopes and occasionally on rocks[74]. Slopes, valleys and plains at elevations of 1000 - 2500 metres[266].

propta Seed - if sown in a cold frame as soon as it is ripe, it usually germinates within a few days[200]. Stored seed does not germinate so well and should be sown in early spring[200]. The seed can also be harvested 'green' (when it has fully developed but before it dries on the tree) and sown immediately in a cold frame. It should germinate very quickly and will produce a larger plant by the end of the growing season[80]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their

stored seed for 24 hours and then stratify for 2 - 4 months at 1 - 8°C. It can be slow to germinate. The seed can be harvested 'green' (when it has fully developed but before it has dried and produced any germination inhibitors) and sown immediately. It should germinate in late winter. If the seed is harvested too soon it will produce very weak plants or no plants at all[80, 113]. When large enough to handle, prick the seedlings out into individual pots and grow them on until they are 20cm or more tall before planting them out in their permanent positions. Layering, which takes about 12 months, is successful with most species in this genus. Cuttings of young shoots in June or July. The cuttings should have 2 - 3 pairs of leaves, plus one pair of buds at the base. Remove a very thin slice of bark at the base of the cutting, rooting is improved if a rooting hormone is used. The rooted cuttings must show new growth during the summer before being potted up otherwise they are unlikely to survive the winter. Cuttings of this species root well.

nwatta Of easy cultivation, it prefers a good moist well-drained soil in a sunny position but tolerates some shade. Grows well in heavy clay soils. Chlorosis can sometimes develop as a result of iron deficiency when the plants are grown in alkaline soils, but in general maples are not fussy as to soil pH. This species prefers its trunk in the shade[11]. Most maples are bad companion plants, inhibiting the growth of nearby plants[18, 20]. Dioecious, male and female plants must be grown if seed is required.

5.2.444 *Pycnanthemum pilosum*

Mountain Mint, Whorled mountainmint
4 tin 8 cyuc 2 kcaak 0 tcan 0 dwat 1.5 m hkuc
hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Pycnanthemum pilosum* is a PERENNIAL growing to 1.5 m (5ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from August to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcaakta Edible Parts: LeavesEdible Uses: Condiment TeaFlower buds and leaves - raw or cooked[K]. A nice addition to salads or used as a condiment. The fresh or dried leaves are brewed into a delicious mint-like tea[183].

nrakta Eastern N. America - Ontario and Michigan south to Tennessee, Arkansas and Oklahoma. ksacta Dry to moist woods, thickets and clearings[43].

propta Seed - sow spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. If there are sufficient seeds they can be sown in an outdoor seedbed in April. Division in spring.

nwatta Succeeds in most soils[1] but prefers a rich loamy soil in full sun or partial shade with plenty of moisture in the growing season[200]. A good butterfly plant[K].

5.2.445 *Malus florentina*

Hawthorn-leaf crab apple
4 tin 8 cyuc 2 kcaak 0 tcan 0 dwat 8 m hkuc
hmimhtut cyutli tucpaha7n hwicli hrasjlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Malus florentina* is a deciduous Tree growing to 8 m (26ft) by 6 m (19ft). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in June, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

pcista All members of this genus contain the toxin hydrogen cyanide in their seeds and possibly also in their leaves, but not in their fruits. Hydrogen cyanide is the substance

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

kcaakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[K]. The oval fruit is about 15mm long and 8mm wide, it ripens in mid autumn and usually blets on the tree. When bletted, it has a mealy texture with a soft acid flesh, we found it refreshing in small quantities[K].

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

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade, though it fruits less well in such a situation[200]. This species is a very good pollinator for the cultivated apples[200]. The fruit is a good wildlife food source, especially for birds[200]. A very ornamental tree, especially when flowering in the spring, it makes a good specimen tree in a lawn[11]. Some botanists believe this species to be a bigeneric hybrid between *M. sylvestris* and *Sorbus torminalis*. They have assigned the name *Malosorbus florentina* to the plant, but this is not generally accepted[11]. Plants in this genus are notably susceptible to honey fungus[200].

5.2.446 *Chamaemelum nobile*

Chamomile, Roman chamomile
4 tin 9 cyuc 2 kcaak 4 tcan 5 dwat 0.2 m hkuc
hmimhtut cyutli hgakyuctcup hwicli hyishrasjlutnyik hpa7tli flatprikliwsslip hpa7tmwatli fyfxhre7t hjonli

drutta *Chamaemelum nobile* is an evergreen Perennial growing to 0.2 m (0ft 8in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in leaf all year, in flower from June to July, and the seeds ripen from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

pcista Patients with severe allergic responses to ragweed (ragwort) should be warned about the possible cross-sensitivity to chamomile and other members of the Asteraceae/Compositae family (e.g. echinacea, feverfew, milk thistle).

kcaakta Edible Parts: Flowers ShootsEdible Uses: Condiment TeaYoung sprigs are used as a seasoning and a flavouring in herb beers[15, 183]. The fresh or dried flowers are used to make herb teas[21, 37, 183]. This has a strong aromatic odour and a bitter flavour, especially the single-flowered form[4]. The whole herb is used for making herbal beers[4].

tcanta Companion Compost Dye Essential Fungicide Hair Liquid feed Repellent StrewingAn infusion of the flowers is used as a hair shampoo, especially for fair hair[14, 20, 168]. It is also used as a liquid feed and general plant tonic[14], effective against a number of plant diseases[18, 20, 201]. It has fungicidal properties and its use is said to prevent damping off in seedlings[238]. The flowers are an ingredient of 'QR' herbal compost activator[32]. This is a dried

5.2.424 *Helianthus strumosus*

Paleleaf Woodland Sunflower
4 tin 8 cyuc 2 kcaak 0 tcan 1 dwat 2 m hkuc
htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Helianthus strumosus* is a PERENNIAL growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcaakta Edible Parts: RootEdible Uses: Root[177]. No more details but it is probably used raw or cooked like the Jerusalem artichoke.

dwatta Anthelmintic PectoralA decoction of the roots has been used to get rid of worms in both adults and children[257]. An infusion of the roots has been used in the treatment of lung problems[257].

nrakta N. America - Quebec to N. Dakota, south to Arkansas and Oklahoma. ksacta Dry woods and banks[235].

propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring or autumn. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Succeeds in most soils in a sunny position[1]. Requires a rich soil[1]. Dislikes shade[1]. Prefers a moist soil[200]. The young growth is extremely attractive to slugs, plants can be totally destroyed by them[K]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Plants have a running root system and can be invasive[1].

5.2.425 *Quercus variabilis*

Chinese Cork Oak
4 tin 8 cyuc 2 kcaak 0 tcan 2 dwat 30 m hkuc
hmimhtut cyutli tcup hwicli jlutnyik hpa7tli flatprikliwis hpa7tmwatli hjonli

drutta *Quercus variabilis* is a deciduous Tree growing to 30 m (98ft 5in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from March to April, and the seeds ripen from October to November. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

kcaakta Edible Parts: SeedEdible Uses: CoffeeSeed - cooked[105, 177]. Very nutritious, but it needs to be leached[179]. The seed is up to 2cm long[200]. It can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed contains bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute.

tcanta Cork Dye Repellent Roofing Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. Oak galls are excrescences that are sometimes produced in great

numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. The bark is a source of cork[11, 123]. A 10 metre tall tree at Kew has less than 4cm thickness of cork on it[K]. A black dye is obtained from the seed cupules[61, 109]. The bark is used for roofing[109]. Wood. Used for boat making and construction[109].

dwatta Astringent DysenteryAny galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta E. Asia - China, Japan, Korea. ksacta Mixed woods, occasionally in pure stands, 800 - 1600 metres in W. China[109]. Evergreen and deciduous forests below 3000 metres[266].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Experimental Crop Industrial Crop: Cork Industrial Crop: Tannin Management: Standard-Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. Prefers warmer summers than are usually experienced in Britain, trees often grow poorly in this country and fail to properly ripen their wood resulting in frost damage overwinter[200]. A very ornamental tree[1]. Closely related to *Q. acutissima*[1]. Trees respond well to coppicing[109]. The seed ripens in its second year[200]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200].

5.2.426 *Eleutherococcus spinosus*

4 tin 8 cyuc 2 kcaak 0 tcan 2 dwat 3 m hkuc
hmimhtut cyutli tcup hwicli hyishrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Eleutherococcus spinosus* is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. It can tolerate atmospheric pollution.

kcaakta Edible Parts: LeavesEdible Uses: TeaLeaves and young budlings - cooked[46, 61, 105, 116, 177]. The dried leaves are a tea substitute[105, 177]. Although we have no record of the seed being edible, it is said to contain 5.6 - 30.6% protein, 5.6 - 36.6% fat and 2.1 - 3.5% ash[218].

tcanta Hedge HedgePlants can be used as a hedge[200].

dwatta Antirheumatic TonicThe cortex of the root is tonic and analgesic. It is used to treat general debility, rheumatic pains and many other complaints[178, 218]. A wine made from the root is considered to be a general tonic for restoring vigour and restoring sexual potency[218].

nrakta E. Asia - China, C. Japan. ksacta Not known propta Seed - best sown as soon as it is ripe in the autumn in a cold frame[200]. It can be slow to germinate. Stored seed requires 6 months warm followed by 3 months cold stratification[113] and can be very slow to germinate[133]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for at least the first winter. Plant out in late spring or early summer. Cuttings of half-ripe wood, July/August in a frame[113, 200]. Cuttings of ripe wood of the current season's growth, 15 - 30cm long in a cold frame[238]. Root cuttings in late winter[200]. Division of suckers in the dormant season[200].

nwatta Prefers a light warm open loamy humus-rich soil and a position sheltered from north and east winds[11, 200]. Prefers a well-drained soil and full sun[200]. Tolerates urban pollution and poor soils[200]. Plants are hardy to at least -15°C if they are sheltered from cold winds[200]. Considered to be a part of *E. sieboldianus* by some botanists, but this species has smaller leaves[200]. It is closely related to and often confused with *E. divaricatus*[200]. There is a spineless form of this species, known as *Eleutherococcus spinosus* in-ermis (Makino) H. Ohashi[275].

5.2.427 *Aralia chinensis*

Chinese Angelica Tree, Pumila Spirea, Chinese Astilbe
4 tin 8 cyuc 2 kcaak 0 tcan 2 dwat 3.5 m hkuc
hmmihmtu cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliw hpa7tmwatli xre7t hjonli

drutta *Aralia chinensis* is a deciduous Shrub growing to 3.5 m (11ft 6in) at a medium rate. It is frost tender. It is in flower from August to September, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

pcista The bark is considered to be slightly poisonous[218].

kcakta Edible Parts: LeavesEdible Uses: Young shoots - cooked[46, 61, 105, 177]. Used as a vegetable[206]. Blanched and used in salads[116]. Although no records of edibility have been seen for the seed, it is said to contain 5.8 - 17.5% protein, 4.2 - 46.3% fat and 3.7 - 5.7% ash[218].

dwatta Anodyne Carminative Diuretic SialagogueThe stem and root are anodyne and carminative[147, 218]. It is used as a warming pinkilling herb in the treatment of rheumatoid arthritis[238]. The root is also considered to be useful in the treatment of diabetes and dysmenorrhoea[218]. Some caution is advised since the bark is considered to be slightly poisonous[218]. The stem bark is diuretic and sialagogue[218].

nrakta E. Asia - China ksacta Forests on rich well moistened soil[74].

propta Seed - best sown as soon as ripe in a cold frame. Stored seed requires 3 - 5 months of cold stratification. Germination usually takes place within 1 - 4 months at 20°C[134]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in a greenhouse for at least their first winter. Once the plants are 25cm or more tall, they can be planted out into their permanent positions, late spring or early summer being the best time to do this. Root cuttings 8cm long, December in a cold frame[11, 78]. Store the roots upside down in sand and pot up in March/April. High percentage[78]. Division of suckers in late winter[11]. Very easy, the suckers can be planted out direct into their permanent positions if required.

nwatta Landscape Uses:Border, Container, Massing, Rock garden, Woodland garden. Prefers a good deep loam and a semi-shady position[1, 11, 200]. Requires a sheltered position[1]. Plants are hardier when grown in poorer soils[200]. The young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. This species is closely allied to *A. elata*[11]. A very ornamental plant[1, 11]. Special Features:Attractive foliage, Suitable for dried flowers.

5.2.428 *Valeriana sambucifolia*

4 tin 8 cyuc 2 kcaak 0 tcan 3 dwat 1.5 m hkuc
hmmihmtu cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliw hpa7tmwatli xre7t hjonli

drutta *Valeriana sambucifolia* is a PERENNIAL growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow

in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista It is said that prolonged medicinal use of this plant can lead to addiction. A course of treatment should not exceed 3 months.

kcakta Edible Parts: SeedEdible Uses: Condiment TeaYoung leaves - cooked[105]. Seed[172]. No further details are given but the seeds of other members of this genus are parched and then eaten. An essential oil from the leaves and root is used as a flavouring in ice cream, baked goods, condiments etc[183]. The leaves can also be used as a condiment[61]. The plant is used in moderation as a herbal tea[183].

tcanta Compost Essential Liquid feed RepellentThe plant yields about 1% of an essential oil from the roots[7, 238]. It is used in perfumery to provide a 'mossy' aroma[57, 61, 238], though the scent is considered to be disagreeable by many people[207]. The dried roots are also placed in linen cupboards and clothes drawers in order to scent the clothes[4]. The dried root attracts rats and cats, it can be used as a bait to lure them away from other areas[100]. An ingredient of 'QR' herbal compost activator[32]. This is a dried and powdered mixture of several herbs that can be added to a compost heap in order to speed up bacterial activity and thus shorten the time needed to make the compost[K]. The plant can also be used to make a very good liquid plant feed[14, 18, 201]. It attracts earthworms[14, 18]. The leaves are very rich in phosphorus[201].

dwatta Antispasmodic Carminative Diuretic Eczema Hypnotic Nervine Sedative StimulantValerian is a well-known and frequently used medicinal herb that has a long and proven history of efficacy. It is noted especially for its effect as a tranquilliser and nerve, particularly for those people suffering from nervous overstrain[4, 222]. Valerian has been shown to encourage sleep, improve sleep quality and reduce blood pressure[254]. It is also used internally in the treatment of painful menstruation, cramps, hypertension, irritable bowel syndrome etc[238, 254]. It should not be prescribed for patients with liver problems[238]. Externally, it is used to treat eczema, ulcers and minor injuries[238]. The root is antispasmodic, carminative, diuretic, hypnotic, powerfully nervine, sedative and stimulant[4, 7, 9, 14, 21, 46, 147, 165, 192, 218]. The active ingredients are called valepotriates, research has confirmed that these have a calming effect on agitated people, but are also a stimulant in cases of fatigue[222]. The roots of 2 year old plants are harvested in the autumn once the leaves have died down and are used fresh or dried[4, 9, 238]. The fresh root is about 3 times as effective as roots dried at 40° (the report does not specify if this is centigrade or fahrenheit), whilst temperatures above 82° destroy the active principle in the root[240]. Use with caution[21, 238], see the notes above on toxicity.

nrakta Europe. ksacta Damp shady places[50].

propta Seed - sow spring in a cold frame and only just cover the seed because it requires light for germination[200]. Prick out the seedlings into individual pots when they are large enough to handle and plant out into their permanent positions in the summer if sufficient growth has been made. If the plants are too small to plant out, grow them on in the greenhouse or frame for their first winter and plant them out early in the following summer. Division in spring. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring.

nwatta Succeeds in ordinary garden soil[1], preferring a moist site[7, 17]. Succeeds in full sun or in partial shade[233]. This species is considered to be no more than a sub-species of *V. officinalis* by many botanists[200], it has the same uses as that species[4]. Often grown in the herb garden and also sometimes grown commercially as a medicinal herb[1, 200]. Cats are very fond of this plant, particularly the powdered root[1, 4, 20]. The root also attracts rats[14]. A good companion for most plants.

5.2.429 *Rosa woodsii*

Western Wild Rose, Woods' rose, Tehachapi rose
4 tin 8 cyuc 2 kcaak 0 tcan 2 dwat 2 m hkuc

Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

5.2.441 *Ulmus davidiana*

Japanese Elm
4 tin 8 cyuc 2 kcaak 0 tcan 0 dwat 15 m hkuc
hmmihmtu cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliw hpa7tmwatli xre7t hjonli

drutta *Ulmus davidiana* is a deciduous Tree growing to 15 m (49ft 3in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit Inner bark LeavesEdible Uses: Leaves - raw or cooked[105, 177]. Young fruits - cooked[105, 177]. Inner bark - dried, ground into a powder and used as a thickening in soups or added to cereal flours when making bread etc[105, 177].

tcanta Fibre WoodA fibre is obtained from the inner bark[189]. The bark is soaked for 7 - 10 days in water; the inner and outer barks are then separated and the inner bark is stripped into strands and made into thread by chewing it. It is made into a coarse fabric[189]. Wood - heavy, difficult to work. Used for axles, hubs etc[46, 61].

nrakta E. Asia - China, Japan, Korea. ksacta Slopes, wetlands near streams and valleys at elevations of 2000 - 2300 metres[266].

propta Seed - if sown in a cold frame as soon as it is ripe, it usually germinates within a few days[200]. Stored seed does not germinate so well and should be sown in early spring[200]. The seed can also be harvested 'green' (when it has fully developed but before it dries on the tree) and sown immediately in a cold frame. It should germinate very quickly and will produce a larger plant by the end of the growing season[80]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Plants should not be allowed to grow for more than two years in a nursery bed since they form a tap root and will then move badly. Layering of suckers or coppiced shoots[200].

nwatta Prefers a fertile soil in full sun[188], but it is easily grown in any soil of at least moderate quality so long as it is well drained[1]. This species is resistant to 'Dutch elm disease', a disease that has destroyed the greater part of all the elm trees growing in Britain. The disease is spread by means of beetles. There is no effective cure (1992) for the problem, but most E. Asian, though not Himalayan, species are resistant (though not immune) to the disease so the potential exists to use these resistant species to develop new resistant hybrids with the native species[200]. The various species of this genus hybridize freely with each other and pollen is easily saved, so even those species with different flowering times can be hybridized[200]. Closely related to *U. japonica*[200].

5.2.442 *Cornus quinquenervis*

4 tin 8 cyuc 2 kcaak 0 tcan 0 dwat 3 m hkuc
hmmihmtu cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliw hpa7tmwatli xre7t hjonli

drutta *Cornus quinquenervis* is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: A specimen of this species seen growing at Kew in September 1994 was carrying a few red fruits about 30mm long and 12mm wide - these were not fully ripe and were slightly astringent but they showed some potential[K]. There must be some doubt about the validity of the name of the Kew plant since the botanical description of the plant says that the fruits are black, globose and 6mm in diameter[266].

nrakta E. Asia - China. ksacta Hillsides, mountain forests and thickets by streams from sea level to 2500 metres[266].

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

nwatta An easily grown plant, it succeeds in any soil of good or moderate fertility[1], ranging from acid to shallow chalk[200]. Grows well in heavy clay soils. Succeeds in full sun or light shade[188]. Plants in this genus are notably resistant to honey fungus[200].

5.2.443 *Acer argutum*

4 tin 8 cyuc 2 kcaak 0 tcan 0 dwat 8 m hkuc
hmmihmtu cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliw hpa7tmwatli nyanhjen hjonli

drutta *Acer argutum* is a deciduous Tree growing to 8 m (26ft 3in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in April, and the seeds ripen in October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). . The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: SapEdible Uses: SweetenerThe sap contains a certain amount of sugar and can either be used as a drink, or the sap can be concentrated into a syrup by boiling off the water[105, 177]. The syrup is used as a sweetener on many foods. The tree trunk is tapped in the early spring, the sap flowing better on warm sunny days following a frost. The best sap production comes from cold-winter areas with continental climates.

tcanta PreservativeThe leaves are packed around apples, rootcrops etc to help preserve them[18, 20].

nrakta E. Asia - central and southern Japan. ksacta In cool temperate to lower subalpine forests, usually growing in moist sites at streamsides at elevations of 800 - 1900 metres[275].

propta Seed - best sown as soon as it is ripe in a cold frame, it usually germinates in the following spring. Pre-soak

in California[71].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. Stored seed requires 4 - 5 months cold stratification at between 0 to 9°C and should be sown as early in the year as possible[113, 164]. Under normal storage conditions the seed can remain viable for 17 years or more. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter, planting them out in late spring of the following year. Cuttings of half-ripe wood, 10 - 15cm with a heel, July/August in a frame[78, 113]. Cuttings of mature wood of the current year's growth, preferably with a heel of the previous year's growth, November to February in a cold frame or sheltered bed outdoors[78, 200].

nwatta Easily grown in a moisture retentive but well-drained loamy soil of at least moderate quality[11, 200]. Plants are quite tolerant of shade though do not fruit so well in such a position[11]. Hardy to about -20°C[200]. This species is closely related to *R. cereum*[11, 200]. Plants can harbour a stage of 'white pine blister rust', so they should not be grown in the vicinity of pine trees[155]. Plants in this genus are notably susceptible to honey fungus[200].

5.2.438 *Cardamine scutata*

4 tlin 8 cyuc 2 kcaak 0 tcan 0 dwat 0.3 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyikfrip hpa7tli flat-priklwis hpa7tmwatli fyifxre7t hjonli

drutta *Cardamine scutata* is a ANNUAL/BIENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to August, and the seeds ripen from May to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked[105, 177]. A hot peppery flavour.

nrakta E. Asia - Japan ksacta Wet places in lowland and mountains all over Japan[58]. Valleys, shady slopes, damp sites, along ditches, rock crevices, mountain slopes, roadsides, streamsides, sea level to 2100 metres[266].

propta Seed - sow spring or autumn in situ.

nwatta We have very little information on this species and do not know if it will be hardy in Britain, though judging by its native range it should succeed outdoors in most parts of this country. The following notes are based on the general needs of the genus. Prefers a moist humus rich soil in shade or semi-shade[200] but succeeds in most soils that are not dry[1].

5.2.439 *Lamium purpureum*

Red Dead Nettle, Purple deadnettle

4 tlin 8 cyuc 2 kcaak 0 tcan 1 dwat 0.3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta *Lamium purpureum* is a ANNUAL growing to 0.3 m (1ft) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from March to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young leaves - raw or cooked as a potherb[2, 4, 5, 8, 54, 62, 183]. The plant is a short-lived annual, but seeds can germinate at almost any time of the year and so the leaves are often available all year round.

dwatta Astringent Diaphoretic Diuretic Purgative Styp-ticThe whole plant is astringent, diaphoretic, diuretic, purgative and styp-tic[4, 46]. A decoction of the plant is particularly

useful for checking any kind of haemorrhage, whilst the fresh bruised leaves can be applied to external cuts and wounds[4].

nrakta Europe, including Britain, from Norway south and east to the Mediterranean and Israel. ksacta Roadsides, waste places and as a common weed of cultivated land[17].

propta Seed - plants usually self sow freely and should not require human intervention. When required, the seed can be sown in situ as soon as it is ripe.

nwatta An easily satisfied plant, it tolerates most soils and conditions. Grows well in heavy clay soils. Dislikes shade. A common garden weed, usually flowering at almost any time of the year and the seed is capable of germinating even in the winter if the weather is mild[17]. In rich soils the plant can grow quite lushly, in poor soils it will only grow a few centimetres tall before flowering and spreading its seed. The plant is easily controlled, however, and never really becomes a pest[K]. Plants seem to be immune to the predations of rabbits[233]. A good bee plant[4, 24]. Grows well with potatoes[14].

5.2.440 *Pyrus communis*

Wild Pear, Common pear

4 tlin 9 cyuc 2 kcaak 3 tcan 1 dwat 13 m hkuc hmimhtut cyutli hgtaccup hwicli hrasjlutnyikfrip hpa7tli flat-priklwis hpa7tmwatli xre7t hjonli

drutta *Pyrus communis* is a deciduous Tree growing to 13 m (42ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from April to May, and the seeds ripen from October to December. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 5]. The fruit of wild pears often remains very hard unless bletted[186]. It is more suitable for use in pies etc. The fruit is up to 5cm long[200].

tcanta Dye Shelterbelt WoodA yellow-tan dye is obtained from the leaves[106, 115]. Trees are sometimes used as part of a shelterbelt planting[227]. Wood - heavy, tough, durable, fine grained, hard. It weighs 51lb per cubic foot[227]. Used by cabinet and instrument makers[11, 61, 100, 149]. When covered with black varnish it is an excellent ebony substitute[74].

dwatta Astringent Febrifuge SedativeThe fruit is astringent, febrifuge and sedative[240].

nrakta Europe. Naturalized in Britain[17]. ksacta Hedges, woodland margins etc in Britain[17].

propta Seed - best sown in a cold frame as soon as it is ripe in the autumn, it will then usually germinate in mid to late winter. Stored seed requires 8 - 10 weeks cold stratification at 1°C and should be sown as early in the year as possible[200]. Temperatures over 15 - 20°C induce a secondary dormancy in the seed[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for their first year. Plant them out in late spring or early summer of the following year.

nwatta Prefers a good well-drained loam in full sun[1, 200]. Grows well in heavy clay soils. Tolerates light shade but does not fruit so well in such a position. Tolerates atmospheric pollution, excessive moisture and a range of soil types, if they are moderately fertile[200], avoiding only the most acid soils[186]. Dislikes very exposed positions[186]. Established plants are drought tolerant[200]. A very hardy plant, tolerating temperatures down to below -15°C[200]. Plants often sucker and can form dense thickets[186]. A parent of the cultivated pear, possibly by crossing with *P. nivalis* and *P. cordata*[11]. There are many hundreds of varieties of cultivated pears and they are widely cultivated in the temperate zone for their edible fruits. By selection of varieties fresh fruits can be obtained from late July to April or May of the following year. Special Features: Edible, Not North American native, Naturalizing, Attractive flowers or blooms. The plant is heat tolerant in zones 9 through 5. (Plant Hardiness

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta *Rosa woodsii* is a deciduous Shrub growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from June to July, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista There is a layer of hairs around the seeds just beneath the flesh of the fruit. These hairs can cause irritation to the mouth and digestive tract if ingested.

kcakta Edible Parts: Flowers Fruit StemEdible Uses: TeaFruit - raw or cooked[101, 155, 257]. They are used in making jams, jellies etc. The taste and texture are best after a frost[116]. The fruit can also be dried and used to make a pleasant tasting fruity-flavoured tea[183]. The fruit is up to 15mm in diameter[200], but there is only a thin layer of flesh surrounding the many seeds[K]. Some care has to be taken when eating this fruit, see the notes above on known hazards. Young shoots - raw[172]. Harvested whilst still tender in the spring, they are best peeled[257]. Petals - raw. Remove the bitter white base[172]. The seed is a good source of vitamin E, it can be ground into a powder and mixed with flour or added to other foods as a supplement[102, 183]. Be sure to remove the seed hairs[102]. The bark, young shoots, leaves and fruit have all been used to make tea-like beverages[257].

dwatta Analgesic Astringent Cancer Diuretic Foot care Poultice Salve Stings Women's complaintsThe seeds have been used as a poultice to produce a drawing effect for treating muscular pains[257]. An infusion of the leaves has been used as a spring tonic[257]. A poultice of the chewed leaves has been used to allay the pain of bee stings[257]. The leaves have been placed in the shoes as a protection from athletes foot[257]. The roots are blood tonic and diuretic[257]. A decoction of the roots has been used by adults and children in the treatment of diarrhoea and intestinal influenza[257]. A decoction of the root or inner bark has been used in the treatment of colds[257]. An infusion of the fruits has been used in the treatment of coughs[257]. Various parts of the plant have been used to make poultices to apply to burns, sores, cuts, swellings and wounds[257]. A decoction of the branches, combined with chokecherry (*Prunus virginiana*) and red willow (*Salix bonplandiana*), has been used in the treatment of various women's complaints, diarrhoea and vomiting[257]. The fruit of many members of this genus is a very rich source of vitamins and minerals, especially in vitamins A, C and E, flavanoids and other bio-active compounds. It is also a fairly good source of essential fatty acids, which is fairly unusual for a fruit. It is being investigated as a food that is capable of reducing the incidence of cancer and also as a means of halting or reversing the growth of cancers[214].

nrakta Central and Western N. America -Minnesota to Missouri, Northwest Territory, New Mexico and Colorado. ksacta Moist soils of draws, hillsides, along streams and in open valleys. It often forms thickets in open positions[212].

propta Seed. Rose seed often takes two years to germinate. This is because it may need a warm spell of weather after a cold spell in order to mature the embryo and reduce the seedcoat[80]. One possible way to reduce this time is to scarify the seed and then place it for 2 - 3 weeks in damp peat at a temperature of 27 - 32°C (by which time the seed should have imbibed). It is then kept at 3°C for the next 4 months by which time it should be starting to germinate[80]. Alternatively, it is possible that seed harvested 'green' (when it is fully developed but before it has dried on the plant) and sown immediately will germinate in the late winter. This method has not as yet(1988) been fully tested[80]. Seed sown as soon as it is ripe in a cold frame sometimes germinates in spring though it may take 18 months. Stored seed can be sown as early in the year as possible and stratified for 6 weeks at 5°C[200]. It may take 2 years to germinate[200]. Prick out the seedlings into individual pots when they are large enough to handle. Plant out in the summer if the plants are more than 25cm tall, otherwise grow on in a cold frame for the winter and plant out in late spring. Cuttings of half-ripe wood with a heel, July in a shaded frame. Overwinter the plants in the frame and plant out in late spring[78]. High percentage[78]. Cuttings of mature wood of the current seasons growth. Select

pencil thick shoots in early autumn that are about 20 - 25cm long and plant them in a sheltered position outdoors or in a cold frame[78, 200]. The cuttings can take 12 months to establish but a high percentage of them normally succeed[78]. Division of suckers in the dormant season. Plant them out direct into their permanent positions. Layering. Takes 12 months[11].

nwatta Succeeds in most well-drained soils[11], preferring a circumneutral soil and a sunny position[200]. Grows well in heavy clay soils. Dislikes water-logged soils[200]. Grows well with alliums, parsley, mignonette and lupins[18, 20]. Garlic planted nearby can help protect the plant from disease and insect predation[18, 20]. Grows badly with box-wood[18]. Closely related to and hybridizes in the wild with *R. blanda*[11]. Hybridizes freely with other members of this genus[80]. Plants in this genus are notably susceptible to honey fungus[200].

5.2.430 *Aralia mandschurica*

Manchurian Angelica Tree

4 tlin 8 cyuc 2 kcaak 0 tcan 2 dwat m hkuc

hmimhtut cyutli tcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta *Aralia mandschurica* is a deciduous Shrub growing to 3.5 m (11ft 6in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young shoots - cooked. They can also be blanched and used in salads.

dwatta Anodyne Carminative TonicAnodyne, carminative. The root, and especially the bark, stimulates the central nervous system[218]. The plant is said to restore the appetite, memory, vigour etc[218].

nrakta E. Asia - China, Japan, Korea, Manchuria. ksacta Forests on rich well moistened slopes, 900 - 2000 metres in N. Hupeh. Thickets and thin woods in lowland and hills in Japan[58].

propta Seed - best sown as soon as ripe in a cold frame. Stored seed requires 3 - 5 months of cold stratification. Germination usually takes place within 1 - 4 months at 20°C[134]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in a greenhouse for at least their first winter. Once the plants are 25cm or more tall, they can be planted out into their permanent positions, late spring or early summer being the best time to do this. Root cuttings 8cm long, December in a cold frame[11, 78]. Store the roots upside down in sand and pot up in March/April. High percentage[78]. Division of suckers in late winter[11]. Very easy, the suckers can be planted out direct into their permanent positions if required.

nwatta Prefers a good deep loam and a position in semi-shade. Requires a sheltered position. Plants are hardier when grown on poorer soils. The young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. This plant is very closely related to *A. elata* and is included in that species by many botanists[58].

5.2.431 *Berberis concinna*

4 tlin 8 cyuc 2 kcaak 0 tcan 2 dwat 1 m hkuc

hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta *Berberis concinna* is a deciduous Shrub growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruits - raw[272]. The fleshy oblong berries are up to 18mm long[11].

tcanta DyeA yellow dye is obtained from the roots and stems.

dwatta Antibacterial Cancer Dysentery Ophthalmic StomachicBerberine, universally present in rhizomes of Berberis species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Licuorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta E. Asia - Himalayas in Sikkim, Nepal and Tibet. ksacta Forms thickets in open spaces at elevations of 3000 - 3600 metres in Nepal[272].

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78].

nwatta Prefers a warm moist loamy soil and light shade but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. Hybridizes freely with other members of this genus[1]. A very ornamental plant[11]. Plants can be pruned back quite severely and resprout well from the base[200].

5.2.432 Hypochoeris radicata

Cat's Ear

4 tin 8 cyuc 2 kcaak 0 tcan 1 dwat 0.3 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Hypochoeris radicata is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to September, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies lepidoptera. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can not grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young leaves - raw or cooked like spinach[5, 52, 53, 183]. A winter salad[100], it is rather bitter[K]. Young leaves are mild and agreeable[217].

dwatta PectoralPectoral[100].

nrakta Europe, including Britain, from Scandinavia south and east to N. Africa and western Asia. ksacta Meadws and dry pastures, grassy dunes, waysides and open woods[5, 17].

propta Seed - sow spring in a cold frame and only just cover the seed. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. If you have sufficient seed it can be sown outdoors in situ in the spring.

nwatta Requires a well-drained soil and a sunny position or light shade. Another report says that it dislikes shade. A common lawn weed[24].

5.2.433 Chrysosplenium alternifolium

Golden Saxifrage, Alternate-leaf golden saxifrage, Iowa golden saxifrage

4 tin 8 cyuc 2 kcaak 0 tcan 0 dwat 0.3 m hkuc

hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli frus-flatprikliwis hpa7tmwatli fyfxre7t hjonli

drutta Chrysosplenium alternifolium is a PERENNIAL growing to 0.3 m (1ft) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from April to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Beetles, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw[2, 46, 61, 66, 105, 177]. Added to salads[183]. The leaves are rather small, and there is a distinct bitterness in the flavour, especially during hot weather[K].

tcanta The plants creeping habit makes it a good ground cover for the bog garden[200].

nrakta Europe, including Britain, from Scandinavia south to C. France, east to C. Asia and the Himalayas. ksacta Acid soils[200] by the sides of streams, wet rocks and wet ground in woods, usually in shade[17].

propta Seed - sow spring or autumn in a lightly shaded position in a cold frame. Stand the pot in 2cm of water. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a tray of water in the cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in light shade in a cold frame until they are rooting well. Plant them out in the summer or following spring.

nwatta Succeeds in moist soils if they are moist[200]. Requires a constantly wet but well-drained soil[200]. Prefers a shady position, succeeding in woodland[200].

5.2.434 Malus kansuensis

4 tin 8 cyuc 2 kcaak 0 tcan 0 dwat 5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Malus kansuensis is a deciduous Tree growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177]. A very acid flavour even when fully ripe[K]. We have seen fruit that has bletted whilst still on the tree - at this stage the flesh has become very soft and mealy but still has a very acid flavour[K]. The fruit can be up to 1cm in diameter[200].

nrakta E. Asia - N. China. ksacta Mixed forests, among shrubs at elevations of 1500-3300 metres[266].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. It usually germinates in late winter. Stored seed requires stratification for 3 months at 1°C and should be sown in a cold frame as soon as it is received[200]. It might not germinate for 12 months or more. Prick out the seedlings into individual pots as soon as they are large enough to handle. If given a rich compost they usually grow away quickly and can be large enough to plant out in late

summer, though consider giving them some protection from the cold in their first winter. Otherwise, keep them in pots in a cold frame and plant them out in late spring of the following year. Cuttings of mature wood, November in a frame[11].

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[200]. This species is closely related to *M. toringoides*[11]. It hybridizes freely with other members of the genus[200]. The fruit is a good wildlife food source, especially for birds[200]. Plants in this genus are notably susceptible to honey fungus[200].

5.2.435 Prunella grandiflora

4 tin 8 cyuc 2 kcaak 0 tcan 0 dwat 0.2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwisslip hpa7tmwatli xre7t hjonli

drutta Prunella grandiflora is an evergreen Perennial growing to 0.2 m (0ft 8in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf all year, in flower from July to September, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked[46, 61, 105]. A mild flavour[K].

tcanta Can be used as a ground cover plant in a sunny position or light shade[188, 197]. It requires weeding for the first year or so[197]. They are best spaced about 45cm apart each way[208]. Plants have not been a reliable ground cover in Cornwall, often dying after flowering, though they usually self-sow[K].

nrakta Europe. ksacta Grassland, usually in calcareous soils[50].

propta Seed - sow in mid spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. If you have sufficient seed then it can be sown outdoors in situ in mid to late spring. Division in spring or autumn. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Thrives in any damp soil in a shady position[1, 111] or in full sun[200]. Plants are hardy to about -25°C[187]. The sub-species *P. grandiflora pyrenaica* has larger flowers and is found wild on acid soils whilst the type species is usually found on alkaline soils[187]. Plants tend to be short-lived, often dying out after flowering heavily in the summer[208]. Fortunately, they will usually self-sow freely[K]. Most plants are hermaphrodite but sometimes male plants are found.

5.2.436 Cotonaster microphyllus

4 tin 8 cyuc 2 kcaak 3 tcan 1 dwat m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Cotonaster microphyllus is an evergreen Shrub growing to 1 m (3ft 3in) by 2 m (6ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies, midges. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw[272]. It is sweet when fully ripe[158]. A watery flavour[272]. It

is possibly edible[177]. The fruit is about 7mm in diameter[200].

tcanta Basketry Dye Incense Soil stabilization WoodA rose-tan dye is obtained from the fruit. The leaves are used for incense[272]. The plant has an extensive root system and a creeping habit above ground. It makes a good soil binder[272]. The sub-species *C. microphyllus cochleatus* can be used as a ground cover plant in a sunny position[188, 208]. It forms a dense carpet of growth[208]. The branches are used for making baskets[146, 158, 272]. Wood - hard, close and even grained[146, 158]. Used for fuel[272].

dwatta AstringentThe stolons are said to be astringent[240].

nrakta E. Asia - Himalayas. ksacta Trailing on rocks or spreading on grassy hillsides, 1200 - 5400 metres[158]. Rocky slopes, rocky mountain areas, thickets and river valleysat elevations of 2000 - 4200 metres[266].

propta Seed. Members of this genus hybridize freely so, if you require seed that breeds true, it is important to obtain it from a known wild source or from a controlled fertilization of garden plants. The seed is best sown as soon as it is ripe in the autumn in a cold frame, when it will usually germinate in the spring[11, 200]. Stored seed germinates faster if given 3 months warm stratification at 15°C and then 3 months cold stratification at 4°C[164]. The seed usually germinates within 1 - 18 months at 15°C but it can take 2 years[164]. Pot the seedlings up as soon as they are large enough to handle and plant them out into nursery beds or into their permanent positions when they are more than 10cm tall. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200].

nwatta An easily grown plant, it prefers a good soil but also does well in poor soils[1, 11, 200]. It thrives in lime and is also happy in peaty soils[1]. It succeeds in any soil that is not marshy or waterlogged[11, 200]. Succeeds in dry soils[188]. Grows well in heavy clay soils. Succeeds in full sun or semi-shade but does not fruit so freely in a shady position[11, 200]. Tolerates atmospheric pollution[200]. A very hardy plant, tolerating temperatures down to about -25°C[184, 200]. A very ornamental plant[1], there are some named forms[202]. Most forms are quite slow-growing[200, 202]. It hybridizes freely with other members of this genus[200] and often self-sows in British gardens[219]. A low-growing plant, the branches often root when they come into contact with the soil[219]. The flowers, when inhaled near to, have an unpleasant smell like decaying fish[245]. They are very attractive to bees whilst the fruit is a good winter food source for many species of birds[200]. Plants are notably susceptible to honey fungus[200]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

5.2.437 Ribes inebrians

Whisky Currant

4 tin 8 cyuc 2 kcaak 0 tcan 1 dwat 2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Ribes inebrians is a deciduous Shrub growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit - raw or cooked[105, 161, 257]. The fruit can also be dried for later use or made into preserves[105, 257]. One report says that although the fruit was eaten by the Hopi Indians, it could make you ill[216]. Another report says that the fruit was highly relished[257]. The fruit is about 5mm in diameter[200]. Leaves - cooked[105, 161].

dwatta PulticeA pultice of the plant has been applied to sores[257].

nrakta Western N. America - California to Idaho, Nebraska and New Mexico. ksacta Dry slopes to 3700 metres

5.2.555 Lolium temulentum

Darnel

4 tin 8 cyuc 1 kcaak 0 tcan 1 dwat 1 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Lolium temulentum is a ANNUAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can not grow in the shade. It prefers moist soil.

pcista The seed is not poisonous but it is often infected by a fungus which is very toxic. It is probably safer not to eat the seed because of the risk involved[114].

kcaakta Edible Parts: SeedEdible Uses: Seed - cooked. Used as a piñole or ground into a flour and used to make bread etc[213, 257]. It is very nutritious, like oats, but it is not advisable to eat the seed due to the risk of fungal infection[114]. This fungal infection, called ergot, causes hallucinations in small doses but can cause severe damage to the nervous system in larger quantities.

dwatta Anodyne SedativeThe seed is anodyne and sedative[4]. It is not actually the seed, but a fungus that is often found on the seed that has the medicinal properties[K].

nrakta Europe - Mediterranean. An introduced causal in Britain. ksacta Cultivated fields and waste ground in Britain[17].

propta Seed - sow spring in situ.

nwatta Succeeds in ordinary garden soil[1].

5.2.556 Monarda clinopodia

White Basil-Balm, White bergamot

4 tin 8 cyuc 1 kcaak 0 tcan 0 dwat 1.3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta Monarda clinopodia is a PERENNIAL growing to 1.3 m (4ft 3in). See above for USDA hardiness. It is hardy to UK zone 5. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcaakta Edible Parts: Edible Uses: TeaThe fresh or dried leaves and flower heads are brewed into a tea. Said to be excellent when mixed with other teas[183].

nrakta Eastern N. America - New York to Illinois, Georgia and Kentucky. ksacta Woods and thickets[235].

propta Seed - sow mid to late spring in a cold frame. Germination usually takes place within 10 - 40 days at 20°C. When large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in early summer. The seed can also be sown in situ in late summer in areas where the winters are not too severe and will produce larger plants. Cuttings of soft basal shoots in spring. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer. Division in spring or autumn. Large divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Easily grown in ordinary garden soil so long as it is not too dry[1]. Requires a moist soil and a sunny position[1, 200]. Likes some shade. A good bee plant. Plants are subject to mildew in dry summers[200].

5.2.557 Cimicifuga racemosa (Actaea racemosa)

Black Cohosh, Black Snakeroot, Bugbane

4 tin 10 cyuc 1 kcaak 0 tcan 4 dwat 1.5 m hkuc

hmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Cimicifuga racemosa (Actaea racemosa) is a PERENNIAL growing to 1.5 m (5ft) by 0.6 m (2ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from July to October, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

pcista The plant is poisonous in large doses[7]. Large doses irritate nerve centres and may cause abortion[268]. Gastrointestinal disturbances, hypotension, nausea, headaches. Not recommended during pregnancy or while breastfeeding. Do not take concomitantly with iron [301].

kcaakta Leaves - cooked[105]. Some caution is advised, see the notes above on toxicity.

tcanta Both the growing and the dried plant can be used to repel bugs and fleas[211].

dwatta Black cohosh is a traditional remedy of the North American Indians where it was used mainly to treat women's problems, especially painful periods and problems associated with the menopause[254]. A popular and widely used herbal remedy, it is effective in the treatment of a range of diseases[4]. The root is alternative, antidiote, antirheumatic, antispasmodic, astringent, cardiotoxic, diaphoretic, diuretic, emmenagogue, expectorant, hypnotic, sedative, tonic and vasodilator[4, 7, 21, 46, 57, 165, 192, 222]. It is harvested in the autumn as the leaves die down, then cut into pieces and dried[4]. The root is toxic in overdose, it should be used with caution and be completely avoided by pregnant women[222]. See also the notes above on toxicity. The medically active ingredients are not soluble in water so a tincture of the root is normally used[222]. It is used in the treatment of rheumatism, as a sedative and an emmenagogue[213]. It is traditionally important in the treatment of women's complaints, acting specifically on the uterus it eases uterine cramps and has been used to help in childbirth[222, 268]. Research has shown that the root has oestrogenic activity and is thought to reduce levels of pituitary luteinizing hormone, thereby decreasing the ovaries production of progesterone[222, 254]. The root is also hypoglycaemic, sedative and anti-inflammatory[222]. Used in conjunction with St. John's Wort (Hypericum perforatum) it is 78% effective in treating hot flushes and other menopausal problems[254]. An extract of the root has been shown to strengthen the male reproductive organ in rats[222]. The root contains salicylic acid, which makes it of value in the treatment of various rheumatic problems - it is particularly effective in the acute stage of rheumatoid arthritis, sciatica and chorea[268]. Its sedative action makes it useful for treating a range of other complaints including tinnitus and high blood pressure[254]. The roots are used to make a homeopathic remedy[232]. This is used mainly for women, especially during pregnancy[232]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Cimicifuga racemosa (Actaea racemosa) for climacteric (menopause) complaints, Premenstrual syndrome. (see [302] for critics of commission E).

nrakta Eastern N. America - Massachusetts to Ontario, south to Georgia and Tennessee. ksacta Moist, mixed deciduous forests, wooded slopes, ravines, creek margins, thickets, moist meadows, forest margins, and especially mountainous terrain from sea level to 1500 metres[270].

propta Seed - best sown as soon as it is ripe in a cold frame[1]. Only just cover the seed. It germinates in 1 - 12 months or even longer at 15°C[164]. The seed does not store well and soon loses its viability[200], stored seed may germinate better if given 6 - 8 weeks warm stratification at 15°C and then 8 weeks cold stratification[164]. Prick out the young seedlings into individual pots when they are large enough to handle and grow them on in a frame for their first winter. Plant out in late spring or early summer[K]. Division in spring or autumn[1]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the summer or following spring.

nwatta Landscape Uses:Border, Container, Woodland garden. Prefers a moist humus rich soil and some shade[1,

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotoxic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta South-eastern N. America - New York to Florida, west to Texas and Oklahoma. ksacta Sandy or rocky banks or woods[43].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them out in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. This species is often confused with *C. tomentosa*. L.[235]. It hybridizes freely with other members of the genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

5.2.478 Lonicera involucrata

Twinberry, Twinberry honeysuckle

4 tin 8 cyuc 2 kcaak 0 tcan 2 dwat 1.2 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Lonicera involucrata is a deciduous Shrub growing to 1.2 m (4ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in May, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

kcaakta Edible Parts: FruitEdible Uses: Fruit - raw or dried[2, 46, 65, 155]. A pleasant taste[161]. Not tasty enough to be widely sought[212]. The only form we have tried has an incredibly bitter taste[K]. The fruit is about 8mm in diameter[200].

tcanta Disinfectant Dye HairA purple dye is obtained from the fruit[99, 257]. It is grey when tin is used as a mordant[168]. The berries are rubbed onto the scalp as a hair tonic. It is said to prevent greyness[99]. (don't mix the berries with tin though!![K])

dwatta Antidandruff Antipruritic Disinfectant Emetic Galactagogue Laxative Ophthalmic Pectoral PoulitceTwinberry was employed medicinally by a number of native North American Indian tribes who used it to treat a range of complaints[257]. It is little, if at all, used in modern herbalism. The bark is disinfectant, galactagogue, ophthalmic and pectoral[257]. A decoction is used in the treatment of coughs and as an eyewash[257]. A decoction of the bark has been applied to a woman's breasts to encourage milk flow[257]. The bark has also been used as a dressing on burns[257]. The leaves are antipruritic and ophthalmic[257]. A poultice of the chewed leaves is applied to venereal sores, itchy skin and boils[218, 257]. A decoction of the leaves is used as an eye wash[257]. The fruits are antidandruff, emetic, laxative and pectoral[218, 257]. An infusion is used to treat chest and stomach complaints and to cleanse the body[257]. The mashed fruit has been rubbed into the scalp as a treatment for dandruff.

nrakta Western N. America - Alaska to Mexico. ksacta Calcareous woods, banks of streams and swamps[43] and in open coniferous forests[155], usually on limestone[184].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed requires 2 months cold stratification[113] and should be sown as soon as possible in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm with or without a heel, July/August in a frame. Good percentage[78]. Cuttings of mature wood of the current season's growth, 15 - 20cm with or without a heel, November in a cold frame. Good percentage[78]. Layering in autumn[200].

nwatta An easily grown and very tolerant plant, succeeding in any fertile soil, and preferring a good moist soil in a sunny position[11, 200]. It produces less fruit when grown in the shade[200]. Plants have proved to be quite wind resistant when growing on an exposed site in Cornwall[K]. Plants are hardy to about -25°C[184]. Closely allied to *L. ledebourii*[11]. There are some named forms, developed for the ornamental garden[182]. 'Humilis' is a smaller form and 'Serotina' is later flowering[182].

5.2.479 Aster amellus

Italian Aster

4 tin 8 cyuc 2 kcaak 0 tcan 2 dwat 0.7 m hkuc htut cyutli tcup hwicli hyishrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta Aster amellus is a PERENNIAL growing to 0.7 m (2ft 4in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from September to October, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcaakta Edible Parts: LeavesEdible Uses: Leaves and young plants - cooked[177]. Only certain varieties (not specified in the report) are used[177]. A nutritional analysis is available[218].

dwatta Antiinflammatory Antitussive Depurative Haemostatic Malaria PectoralThe roots are anti-inflammatory, antitussive, depurative, haemostatic and pectoral[61, 147].They are used in the treatment of coughs, pulmonary affections and malaria[240]. The root juice is used internally in Nepal to treat indigestion and externally to treat boils[272].

nrakta Europe to E. Asia. ksacta Scrub and wood margins.[50] Marshy places and lake sides[178], mainly on limestone soils[200].

propta Seed - surface sow in spring in a cold frame. Do not allow the compost to become dry. Pre-chilling the seed

for two weeks can improve germination rates[134]. The seed usually germinates in 2 weeks at 20°C[134]. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn[200].

nwatta Succeeds in most good garden soils[1], preferring one that is well-drained and moisture retentive[200]. Tolerates poorer soils[233]. Prefers a sunny position[200] but also succeeds in part shade[233]. Plants are hardy to about -25°C[187]. A very ornamental plant[1], there are some named varieties[233]. A polymorphic species[50], it hybridizes freely with other members of this genus[200]. Most species in this genus seem to be immune to the predations of rabbits[233].

5.2.480 Cardamine leucantha

4 tin 8 cyuc 2 ckak 0 tcan 1 dwat 0.6 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flat-prikwlis hpa7tmwatli fyfjxre7t hjonli

drutta Cardamine leucantha is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to August, and the seeds ripen from May to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: LeavesEdible Uses: TeaLeaves - raw or cooked[105, 177]. The seedlings are edible[266]. Dried plants are used as a tea substitute[266].

dwatta The rhizomes are used medicinally[266]. No further information is given.

nrakta E. Asia - China, Japan. ksacta Wet places by ponds and streams, in mountains all over Japan[58].

propta Seed - sow spring in a cold frame. Germination usually takes place within 1 - 3 weeks at 15°C[175]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in a greenhouse or cold frame for the first two years, planting them out when dormant in late summer. Division in early spring or after the plant dies down in the summer. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta We have very little information on this species and do not know if it will be hardy in Britain, though judging by its native range it should succeed outdoors in most parts of this country. The following notes are based on the general needs of the genus. Prefers a moist humus rich soil in shade or semi-shade[200] but succeeds in most soils that are not dry[1].

5.2.481 Lilium concolor

Morning Star Lily

4 tin 8 cyuc 2 ckak 0 tcan 2 dwat 0.6 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikwlis hpa7tmwatli xre7t hjonli

drutta Lilium concolor is a BULB growing to 0.6 m (2ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from June to July, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Bulb - cooked[2, 105]. The bulb is up to 35mm in diameter[266]. Rich in starch, it can be used as a vegetable in similar ways to potatoes (Solanum tuberosum). Young leaves - cooked[177]. Flowers[178]. No more details are given.

dwatta Carminative Expectorant Pectoral Poulitice Sedative TonicThe bulb is carminative, expectorant, pectoral, sedative and tonic[147, 218]. It is taken internally in the

treatment of bronchial complaints[238]. The flowers invigorate the blood[218]. They are poulticed onto sores and boils[218].

nrakta E. Asia - China ksacta Scrub in pockets of humus on carboniferous limestone and in heavy lime soil, 1500 - 2200 metres[90]. Moist places in forests, thickets, moist meadows, grassy slopes and sunny grassland[266].

propta Seed - immediate epigeal germination[130]. Sow thinly in pots from late winter to early spring in a cold frame. Should germinate in 2 - 4 weeks[163]. Great care should be taken in pricking out the young seedlings, many people prefer to leave them in the seed pot until they die down at the end of their second years growth. This necessitates sowing the seed thinly and using a reasonably fertile sowing medium. The plants will also require regular feeding when in growth. Divide the young bulbs when they are dormant, putting 2 - 3 in each pot, and grow them on for at least another year before planting them out into their permanent positions when the plants are dormant[K]. Division with care in the autumn once the leaves have died down. Replant immediately[200]. Bulb scales can be removed from the bulbs in early autumn. If they are kept in a warm dark place in a bag of moist peat, they will produce bulblets. These bulblets can be potted up and grown on in the greenhouse until they are large enough to plant out[200].

nwatta Prefers an open free-draining humus-rich loamy soil with its roots in the shade and its head in the sun[143, 200]. Prefers an acid sandy soil but also succeeds on heavy soils[47, 143]. Plants are lime tolerant[47, 143, 200]. Requires a sheltered position if grown outdoors, doing well on a rock garden, but it is best grown in a greenhouse[163] Stem rooting, the bulbs should be planted 7 - 10 cm deep[143, 200]. Early to mid autumn is the best time to plant out the bulbs in cool temperate areas, in warmer areas they can be planted out as late as late autumn[200]. A very ornamental plant[1], it is cultivated for its edible bulb in Japan[2]. The plant should be protected against rabbits and slugs in early spring. If the shoot tip is eaten out the bulb will not grow in that year and will lose vigour[200].

5.2.482 Hosta sieboldiana

4 tin 8 cyuc 2 ckak 0 tcan 0 dwat 1 m hkuc pcmhmmhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flat-prikwlis hpa7tmwatli xre7t hjonli

drutta Hosta sieboldiana is a PERENNIAL growing to 1 m (3ft 3in) by 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from May to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves StemEdible Uses: Young leaves and leaf stems - cooked[105, 177].

tcanta A useful ground cover plant, succeeding in dense shade, though rather slow spreading[197]. Plants should be spaced about 60cm apart each way[208].

nrakta E. Asia - Japan. ksacta Rich fertile soils in mountain valleys and forest margins[251].

propta Seed - sow spring in a lightly shaded position in a greenhouse and only just cover the seed. Germination usually takes place within 1 - 3 months at 10°C. Make sure you keep the compost moist. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division is possible at almost any time of the year so long as there is sufficient moisture[233]. It is best carried out in March as growth commences or in early autumn if the soil is not too dry[200]. Hostas can be left undivided for many years and should not be divided any more frequently than once every 3 - 5 years to allow the leaves to reach maturity[200].

nwatta Thrives in most fertile soils if they are rich in humus[200]. Grows well in heavy clay soils and in sandy ones[208]. Very limy soils inhibit growth, but plants can thrive in such a situation if plenty of humus is added[208]. Prefers a pH between 6 and 7[200]. Requires a rich soil

tcanta CosmeticThe plant is an ingredient in many anti-wrinkle cosmetic preparations for the skin[7].

dwatta Antidiarrhoeal Antispasmodic Astringent Febriuge OdontalgicBoth the roots and the herb are antispasmodic, astringent and febrifuge[4, 7, 9, 54, 240]. An infusion of the dried herb is used in the treatment of diarrhoea etc, it is also used as a gargle for sore throats and is used externally as an astringent lotion[4]. A concentrated decoction of the root relieves toothache[7].

nrakta Europe, including Britain, from Norway south and east to the Mediterranean, Siberia, Himalayas. ksacta Dry sunny locations in meadows, pastures and waste ground[4, 9], usually on basic or neutral soils[17].

propta Seed - sow early spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring or autumn. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Easily grown in a well-drained loam, preferring a dry position in full sun but tolerating shade[1]. Prefers an alkaline soil but tolerates a slightly acid soil[200]. The plant spreads vigorously by means of runners and can be invasive with new runners up to 1.5 metres long being produced each year[1, 4]. Members of this genus are rarely if ever troubled by browsing deer[233]. The flowers are partially closed in dull weather and close completely of a night time[4]. When closing, self-fertilisation is affected because the anthers are caused to touch the stigmas[4].

5.2.552 Silphium laeve

4 tin 8 cyuc 1 ckak 0 tcan 0 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikwlis hpa7tmwatli xre7t hjonli

drutta Silphium laeve is a PERENNIAL. See above for USDA hardiness. It is hardy to UK zone 4. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Root[2, 4, 105]. No more details are given in the reports.

nrakta N. America. ksacta Not known propta Seed - best sown as soon as it is ripe in a greenhouse[200]. Prick out the seedlings into individual pots as soon as they are large enough to handle and plant them out in the summer. Division in spring[188]. This is very difficult due to the deep and extensive root system.

nwatta We have very little information on this species and do not know if it will be hardy in Britain. The following notes are based on the general needs of the genus. Succeeds in any ordinary garden soil[1]. Prefers a deep moisture retentive moderately fertile soil that is not too nitrogen rich, in sun or dappled shade[200]. Plants have a deep and extensive root system which makes transplanting difficult[200].

5.2.553 Elsholtzia fruticosa

Ji Gu Chai

4 tin 8 cyuc 1 ckak 0 tcan 1 dwat 1.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikwlis hpa7tmwatli xre7t hjonli

drutta Elsholtzia fruticosa is a deciduous Shrub growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from August to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: OilEdible Uses: Condiment OilThe powdered seeds are used as a condiment for flavouring food-stuffs[272]. An edible oil is obtained from the seed[272].

tcanta Incense Miscellany Oil Pot-pourriThe highly aromatic foliage is used in pot-pourri[200]. The powdered plant is used for incense[272].

dwatta Anodyne MiscellanyOne report says that the plant is used medicinally, but gives no more information[266]. The juice of the roots is used to relieve headaches[272].

nrakta E. Asia - China, Nepal. ksacta Grasslands, open hills, valleys; 1200-3200 m. Gansu, Guangxi, Guizhou, Hubei, Sichuan, Xizang, Yunnan[266].

propta Seed - sow spring in a greenhouse or cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring.

nwatta Grows well on woodland margins[200]. This species is a sub-shrub, the woody stems often dying back to the base in severe winters[200].

5.2.554 Lysimachia vulgaris

Yellow Loosestrife, Garden yellow loosestrife
4 tin 8 cyuc 1 ckak 0 tcan 2 dwat 1.2 m hkuc hmimhtut cyutli tcuphja7nhs6s hwicli hrasjlutnyikfrip hpa7tli flatprikwlis hpa7tmwatli fyfjxre7t hjonli

drutta Lysimachia vulgaris is a PERENNIAL growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can grow in water.

kcakta Edible Parts: LeavesEdible Uses: Young leaves[105, 177]. No more details are given.

tcanta DyeA yellow dye is obtained from the flowers[13, 100]. A brown dye is obtained from the rhizomes[13]. The growing plant repels gnats and flies, it has been burnt in houses in order to remove these insects[4].

dwatta Antidiarrhoeal Astringent Demulcent Dysentery ExpectorantAn astringent herb, yellow loosestrife is principally used to treat gastro-intestinal conditions such as diarrhoea and dysentery, to stop internal and external bleeding and to cleanse wounds[254]. The herb is astringent, demulcent and expectorant[4, 61]. It is harvested when in flower in July and dried for later use[4]. The plant can be used internally or externally and is useful in checking bleeding of the mouth, nose and wounds, restraining profuse haemorrhages of any kind and in the treatment of diarrhoea[4]. It makes a serviceable mouthwash for treating sore gums and mouth ulcers[254].

nrakta Most areas of Europe and Asia, including Britain, but excluding the extreme north and south. ksacta Marshes, streams and in shallow water in reed swamps[187]. Shady places near water, avoiding acid soils[4, 17].

propta Seed - sow spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn[200]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring. Basal cuttings, March to April in a cold frame. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta An easily grown plant, succeeding in a moist or wet loamy soil in sun or partial shade[187]. Prefers a shady position[111]. Grows well in heavy clay soils. Hardy to at least -25°C[187]. Most species in this genus seem to be immune to the predations of rabbits[233]. A very ornamental plant[1]. The sub-species *L. vulgaris davurica*. (Ledeb.)Kunth. is the form used for food in China and Japan[177].

5.2.549 Artemisia abrotanum

Southernwood

4 tlin 8 cyuc 1 kcaak 0 tcan 3 dwat 1.2 m hkuc hmimhtut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatprikklwis hpa7tmwatli xre7t hjonli

drutta Artemisia abrotanum is a deciduous Shrub growing to 1.2 m (4ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in leaf from March to November, in flower from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

pcista Although no reports of toxicity have been seen for this species, skin contact with some members of this genus can cause dermatitis or other allergic reactions in some people[222]. Safety during pregnancy is not known.

kcakta Edible Parts: Edible Uses: Condiment TeaThe young shoots have a bitter, lemony flavour and are used in small quantities as a flavouring in cakes, salads and vinegars[1, 4, 7, 183, 244]. A tea is made from the young bitter shoots[183].

tcanta Dye Essential Hair Hedge Hedge Incense Pot-pourri RepellentInsect repellent. The growing plant repels fruit tree moths when growing in an orchard[6, 14, 18, 20]. The fresh plant can also be rubbed onto the skin to deter insects[7]. The shoots can be dried for indoor use, they remain effective for 6 - 12 months[169]. They are also said to repel ants[201]. Shoots can be burnt in the fireplace to remove cooking odours from the house[201]. The leaves have a refreshing lemon-like fragrance and are used in pot-pourri[245]. An essential oil from the leaves and flowering shoots is used in perfumery in order to add certain subtle tones[7]. A yellow dye is obtained from the branches[14, 268]. Plants can be grown as a low hedge, they tolerate quite hard clipping[200, 201]. An infusion of the plant is used as a hair tonic or conditioner[201].

dwatta Anthelmintic Antiseptic Cholagogue Deobstruent Emmenagogue Stomachic TonicSouthernwood has a long history of domestic herbal use, though it is now used infrequently in herbal medicine[254]. It is a strongly aromatic bitter herb that improves digestion and liver function by increasing secretions in the stomach and intestines, it stimulates the uterus and encourages menstrual flow, lowers fevers, relaxes spasms and destroys intestinal worms[238, 254]. The herb, and especially the young flowering shoots, is anthelmintic, antiseptic, cholagogue, deobstruent, emmenagogue, stomachic and tonic[4, 7, 165]. The main use of this herb is as an emmenagogue, though it is also a good stimulant tonic and has some nerve principle[4]. It is sometimes given to young children in order to expel parasitic worms and externally it is applied to small wounds in order to stop them bleeding and help them to heal[7]. The herb is also used externally in aromatic baths and as a poultice to treat skin conditions[268]. Southernwood should be used internally with caution, see the notes above on toxicity. It should not be prescribed for pregnant women, especially in the first trimester of pregnancy, since it can encourage menstrual flow[238].

nrakta S. Europe? The original habitat is obscure. ksacta Not known in a truly wild situation.

propta Seed - surface sow from late winter to early summer in a greenhouse. The seed usually germinates in 1 - 2 months at 15°C[134]. When large enough to handle, prick the seedlings out into individual pots. Once the seedlings are more than 15cm tall, plant them out into their permanent positions in late spring or summer. Cuttings of young wood 8cm long, May in a frame[169]. Cuttings of half-ripe wood with a heel, July/August in a frame[1].

nwatta Succeeds in most soils, preferring a well-drained one that is not too rich[1, 11]. Easily grown in a well-drained circumneutral or slightly alkaline loamy soil, preferring a sunny position[1, 200]. Plants are longer lived, more hardy and more aromatic when they are grown in a poor dry soil[245]. Tolerates a pH in the range 6.3 to 7.6. Established plants are drought tolerant. Plants succeed in maritime gardens[233]. Southernwood is often grown in the herb garden, the leaves are very aromatic[182]. It is best to cut the plant back fairly hard every spring in order to keep it com-

pact and encourage plenty of new growth[233, 268]. The plant rarely produces flowers in British gardens[11]. A good companion plant for cabbages[14, 18, 20]. It is also a good plant to grow in the orchard, where it can help to reduce insect pests[201]. Plants in this genus are notably resistant to honey fungus[200]. Members of this genus are rarely if ever troubled by browsing deer[233].

5.2.550 Pimpinella major

Greater Burnet Saxifrage, Hollowstem burnet saxifrage

4 tlin 8 cyuc 1 kcaak 0 tcan 2 dwat m hkuc hmimhtut cyutli tcup hwicli brasjlutnyik hpa7tli flatprikklwis hpa7tmwatli fyifxre7t hjonli

drutta Pimpinella major is a PERENNIAL growing to 0.8 m (2ft 7in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to July, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Photosensitivity possible in light skinned people. Care needed as pimpinella contains essential oils and saponins [301].

kcakta Edible Parts: Edible Uses: CondimentAn essential oil from the roots is used as a flavouring in candy, liqueurs etc[183].

dwatta Antiinflammatory Astringent Carminative Diuretic ExpectorantThe leaves are diaphoretic, diuretic, solvent and stomachic[4]. The plant is harvested as it comes into flower and dried for later use[4]. The root is anti-inflammatory, mildly astringent and expectorant[9]. The fresh root is very hot and acrid, but this pungency is greatly reduced when the root is dried[4]. When chewed, the fresh root is effective in treating toothaches and paralysis of the tongue[4]. An effective diuretic, the root is used in treating disorders arising from obstructions of the viscera[4]. The root is also used for soothing coughs or the effects of laryngitis and bronchitis[9]. The roots can be harvested in the spring or autumn and are dried for later use[9]. The seeds are carminative[4]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Pimpinella major Greater Burnet Saxifrage for cough/bronchitis (see [302] for critics of commission E).

nrakta Europe, including Britain, from Scandinavia south and east to Portugal, the Balkans and Caucasus. ksacta Hedge banks, woodland edges and other grassy places[9].

propta The seed requires a period of cold stratification. If you can obtain fresh seed then it is best sown immediately. This can be done in situ if you have sufficient seed, but if you only have a small quantity then it is safer to sow it in pots in a cold frame. Sow stored seed as soon as you can obtain it, this is probably best done in a cold frame. When they are large enough to handle, prick the pot-grown seedlings out into individual pots and plant them out in the summer.

nwatta Easily grown in any good soil[1], preferring rather moist conditions[187]. Grows best in a cool position[233]. Plants are hardy to about -20°C[187].

5.2.551 Potentilla reptans

Cinquefoil, Creeping cinquefoil

4 tlin 8 cyuc 1 kcaak 0 tcan 2 dwat 1 m hkuc htut cyutli kyuctcup hwicli brasjlutnyik hpa7tli flatprikklwis hpa7tmwatli fyifxre7t hjonli

drutta Potentilla reptans is a PERENNIAL growing to 1 m (3ft 3in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young leaves - raw[7]. A useful addition to salads[7].

that does not dry out readily[1]. Succeeds in full sun as well as in deep shade, growing well in the semi-shade of a woodland[200, 233]. In general, the sunnier the position the moister the soil should be[233]. Plants are best not grown under trees in town gardens since the soot washed from the leaves of the trees in wet weather will tend to remain on the hosta[208]. Plants flower better when grown in a sunny position but the foliage is better when the plant is in a shady position[200]. Plants are in general fully hardy in Britain, but young leaves in spring can be destroyed by frost. New leaves are only produced in the spring and very early summer, so any damage at this time has a deep effect on the plant[233]. A robust plant, densely clump-forming[200]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Plants are very attractive to slugs and snails, the young shoots in spring are especially at risk[111, K]. A very ornamental plant[1], there are many named forms[187]. Hybridizes freely with other members of this genus[200]. This species usually breeds quite true from seed[233].

5.2.483 Crataegus rivularis

River Hawthorn

4 tlin 8 cyuc 2 kcaak 0 tcan 2 dwat 4 m hkuc hmimhtut cyutli hgatcuphja7n hwicli brasjlutnyikfrip hpa7tli flatprikklwisslip hpa7tmwatli xre7t hjonli

drutta Crataegus rivularis is a deciduous Tree growing to 4 m (13ft 1in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[212]. The flesh is thin, dry and mealy[227]. The fruit can also be dried for later use or for making into pemmican[212]. The fruit is high in sugar but low in fats and protein[212]. The fruit is about 10mm in diameter[200]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotoxic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta Western N. America - Wyoming to Idaho, New Mexico, Arizona and Nevada. ksacta Thickets and rocky ground[43]. Borders of streams, 900 - 2,500 metres in Texas[227].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be

best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. There is some doubt over the correct name for this species. [200] suggests that it is a synonym for *C. douglasii* but also records it as a distinct species[K]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

5.2.484 Rosa gallica

French Rose

4 tlin 8 cyuc 2 kcaak 0 tcan 2 dwat 2 m hkuc hmimhtut cyutli tcup hwicli brasjlutnyikfrip hpa7tli flatprikklwisslip hpa7tmwatli xre7t hjonli

drutta Rosa gallica is a deciduous Shrub growing to 2 m (6ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to July, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista There is a layer of hairs around the seeds just beneath the flesh of the fruit. These hairs can cause irritation to the mouth and digestive tract if ingested.

kcakta Edible Parts: FlowersEdible Uses: Condiment-Petals - raw or cooked. They can be added as a decorative garnish to salads[238], and can also be crystallised or preserved in syrup. They are also dried and used as a flavouring in tea, beverages, cakes etc[177, 183]. The dried petals and flower buds are an important ingredient in the Northern African spice mixture 'ras-el-hanou' [238]. Rose water, made by cold-infusing the petals, is used as a flavouring in various confections, especially 'Turkish Delight' [238]. The seed is a good source of vitamin E, it can be ground and mixed with flour or added to other foods as a supplement[102, 183]. Be sure to remove the seed hairs[102].

tcanta Essential Pot-pourriAn essential oil obtained from the flowers is used in perfumery[100], as an additive to bath water and in skin care preparations[238]. Rose water, made by a cold infusion of the petals, is also added to bath water and skin care preparations[238]. The dried petals and buds are used in pot-pourri[238].

dwatta Antibacterial Aromatherapy Astringent Cancer TonicThe petals are antibacterial, astringent and tonic[4, 61]. They are taken internally in the treatment of colds, bronchial infections, gastritis, diarrhoea, depression and lethargy[238]. Externally, they are used to treat eye infections, sore throats, minor injuries and skin problems[238]. The fruit of many members of this genus is a very rich source of vitamins and minerals, especially in vitamins A, C and E, flavanoids and other bio-active compounds. It is also a fairly good source of essential fatty acids, which is fairly unusual for a fruit. It is being investigated as a food that is capable of reducing the incidence of cancer and also as a means of halting or reversing the growth of cancers[214]. The essential oil from the flowers is used in aromatherapy to counter depression, anxiety and negative feelings[238].

nrakta S. and C. Europe. ksacta Hedges and woods, usually on calcareous soils[100].

propta Seed. Rose seed often takes two years to germinate. This is because it may need a warm spell of weather after a cold spell in order to mature the embryo and reduce the seedcoat[80]. One possible way to reduce this time is to scarify the seed and then place it for 2 - 3 weeks in damp peat at a temperature of 27 - 32°C (by which time the seed should have imbibed). It is then kept at 3°C for the next 4 months by which time it should be starting to germinate[80]. Alternatively, it is possible that seed harvested 'green' (when it is fully developed but before it has dried on the plant) and sown immediately will germinate in the late winter. This method has not as yet(1988) been fully tested[80]. Seed sown as soon as it is ripe in a cold frame sometimes germinates in spring though it may take 18 months. Stored seed can be sown as early in the year as possible and stratified for 6 weeks at 5°C[200]. It may take 2 years to germinate[200]. Prick out the seedlings into individual pots when they are large enough to handle. Plant out in the summer if the plants are more than 25cm tall, otherwise grow on in a cold frame for the winter and plant out in late spring. Cuttings of half-ripe wood with a heel, July in a shaded frame. Overwinter the plants in the frame and plant out in late spring[78]. High percentage[78]. Cuttings of mature wood of the current seasons growth. Select pencil thick shoots in early autumn that are about 20 - 25cm long and plant them in a sheltered position outdoors or in a cold frame[78, 200]. The cuttings can take 12 months to establish but a high percentage of them normally succeed[78]. Division of suckers in the dormant season. Plant them out direct into their permanent positions. Layering. Takes 12 months[11].

nwatta Succeeds in most soils[11], preferring a circum-neutral soil and a sunny position[200]. Grows well in heavy clay soils. Dislikes water-logged soils[200]. Grows well with alliums, parsley, mignonette and lupins[18, 20]. Garlic planted nearby can help protect the plant from disease and insect predation[18, 20]. Grows badly with boxwood[18]. A very ornamental plant[1], the flowers have a spicy fragrance[245]. It is cultivated for its essential oil in Eastern Europe[100]. There are some named varieties[200]. 'Officialis' is the Apothecary's rose, it has been cultivated for its medicinal virtues[200]. Plants produce suckers[200]. Hybridizes freely with other members of this genus[80]. Plants in this genus are notably susceptible to honey fungus[200].

5.2.485 Rubus affinis

4 tin 8 cyuc 2 kcaak 0 tcan 0 dwat 3 m hkcuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Rubus affinis is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to September, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177]. Large[150].

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

nrakta Europe to Asia. Rare in Britain[50] according to one report but it is not in [17]. ksacta Moist heath and grassland[50].

propta Seed - requires stratification and is best sown in early autumn in a cold frame. Stored seed requires one month stratification at about 3°C and is best sown as early as possible in the year. Prick out the seedlings when they are large enough to handle and grow on in a cold frame. Plant them out into their permanent positions in late spring of the following year. Cuttings of half-ripe wood, July/August in a frame[200]. Tip layering in July. Plant out in autumn. Division in early spring or just before leaf-fall in the autumn[200].

nwatta Easily grown in a good well-drained loamy soil in sun or semi-shade[11, 200]. Hardy to at least -15°C. This species is a blackberry with biennial stems[200]. New shoots are produced from the roots each year, these flower and fruit

in their second year and then die[200]. Plants in this genus are notably susceptible to honey fungus[200].

5.2.486 Crataegus phaenopyrum

Washington Thorn, Washington Hawthorn
4 tin 8 cyuc 2 kcaak 0 tcan 2 dwat 10 m hkcuc
hmimhtut cyutli hgattcuphia7n hwicli hrasjlutnyikfrp hpa7tli flatprikliwislip hpa7tmwatli xre7t hjonli

drutta Crataegus phaenopyrum is a deciduous Tree growing to 10 m (32ft) by 10 m (32ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in July, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[62]. A dry flesh[43]. Very small, about 5mm in diameter, it often hangs on the tree all winter[200]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta South-eastern N. America - Virginia to Georgia, Illinois and Kansas. ksacta Thickets, open woods[43] and banks of streams in rich soils[82].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta Landscape Uses:Espalier, Firewood, Pollard, Specimen, Street tree. A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges

tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Edible Parts: Leaves Seed StemEdible Uses: Young leaves - cooked[8, 22, 46, 61]. A bitter taste, especially if the older leaves are used[105, 183]. The leaves are usually cooked in at least one change of water in order to reduce the bitterness[183]. Leaves can also be dried for later use[12]. The leaves have a much milder flavour when they are first produced in early spring[K]. Young stems - cooked[257]. Seed - raw or cooked[102, 172]. The seed can also be ground into a powder and used to make a gruel or added to cereal flours when making bread etc[102]. It is rather small and fiddly to harvest.

tcanta DyeYellow, dark green to brown and dark grey dyes can be obtained from the roots of this plant[14, 168]. They do not need a mordant[168].

dwatta Astringent Blood purifier Contraceptive SalveThe leaves are often applied externally as a rustic remedy in the treatment of blisters, burns and scalds[4, 14]. The root contains tannin and is astringent and blood purifier[257]. A tea made from the roots has been used in the treatment of jaundice, whooping cough, boils and bleeding[4, 257]. An infusion of the root has been used as a wash, especially for children, to treat skin eruptions[257]. One report says that the root has been used as a contraceptive to stop menstruation[257]. The root is harvested in early spring and dried for later use[4].

nrakta Western Europe, including Britain, from Scandinavia south and east to Spain, Germany and Hungary. ksacta Waste ground, hedgerows and field margins[17]. A common weed of cultivated land on acid or calcareous soils[12]. propta Seed - sow spring in situ. Division in spring.

nwatta Requires a good soil[4]. Plants are occasionally cultivated for their edible leaves[61]. A very important food plant for the caterpillars of many species of butterfly[30]. This species is an alternative host of the turnip fly[4].

5.2.547 Veronica longifolia

Garden Speedwell, Long-Leaf Speedwell
4 tin 10 cyuc 1 kcaak 0 tcan 0 dwat 1 m hkcuc
htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta Veronica longifolia is a PERENNIAL growing to 1 m (3ft 3in) by 0.3 m (1ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves and young shoots - raw or cooked. A famine food, they are only used when all else fails[179].

nrakta N. E. and C. Europe to S.W. Asia, Mongolia, Korea and N. China. ksacta Steppes, grassy mountain slopes, meadows at forest edges and birch forests below 1500 metres in northwest China[266].

propta Seed - sow autumn in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in direct into spring[200]. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring.

nwatta Landscape Uses:Border, Massing. Easily grown in a moderately fertile moisture retentive well drained soil[200]. Prefers cool summers[200]. A number of cultivars have been selected for their ornamental value[200]. Special Features:Attractive foliage, Naturalizing, Suitable for cut flowers, Extended bloom season in Zones 9A and above.

5.2.548 Sambucus ebulus

Dwarf Elder, Dwarf elderberry
4 tin 8 cyuc 1 kcaak 0 tcan 2 dwat 1.2 m hkcuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrp hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta Sambucus ebulus is a PERENNIAL growing to 1.2 m (4ft) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

pcista Although no specific mention has been seen for this species, the leaves and stems of some, if not all, members of this genus are poisonous[9, 76]. The fruit of this species has been known to cause stomach upsets to some people. Any toxin the fruit might contain is liable to be of very low toxicity and is destroyed when the fruit is cooked[65, 76].

kcakta Edible Parts: FruitEdible Uses: TeaFruit - cooked. It is used as a flavouring in soups etc[177]. The fruit is about 6mm in diameter and is borne in large clusters[200]. Some caution is advised, see the notes above on toxicity. Leaves are used as a tea substitute[105, 177]. Some caution is advised, see the notes above on toxicity.

tcanta Dye Hair Ink RepellentA blue dye and an ink are obtained from the fruit[13, 46, 61, 115]. The root juice is used to dye hair black[4]. The leaves are said to repel mice and moles[4, 115]. Plants make a dense ground cover when spaced about 1 metre apart each way[208]. They are best used in large areas, roadsides etc[208]. Our experience to date (1995) is that the plants spread vigorously but do not form a dense cover and so do not exclude other plants[K].

dwatta Antiphlogistic Antirheumatic Appetite Suppressant Cholagogue Diaphoretic Diuretic Expectorant Homeopathy Poulitice PurgativeThe leaves are antiphlogistic, cholagogue, diaphoretic, diuretic, expectorant and laxative[4, 7, 9, 13, 21, 240]. The fruit is also sometimes used, but it is less active than the leaves[4]. The herb is commonly used in the treatment of liver and kidney complaints[4]. When bruised and laid on boils and scalds, they have a healing effect[4]. They can be made into a poultice for treating swellings and contusions[4]. The leaves are harvested in the summer and can be dried for later use[7]. The root is diaphoretic, mildly diuretic and a drastic purgative[4, 7, 9]. Dried, then powdered and made into a tea, it is considered to be one of the best remedies for dropsy[4, 240]. It should only be used with expert supervision because it can cause nausea and vertigo[9]. A homeopathic remedy is made from the fresh berries or the bark[9]. It is used in the treatment of dropsy[9].

nrakta Europe, including Britain, from the Netherlands south and east to the Mediterranean and Himalayas. ksacta Waste ground, woods, hedgerows and scrub. especially on calcareous soils[7, 13].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame, when it should germinate in early spring. Stored seed can be sown in the spring in a cold frame but will probably germinate better if it is given 2 months warm followed by 2 months cold stratification first[78, 98, 113]. Prick out the seedlings into individual pots when they are large enough to handle. If good growth is made, the young plants can be placed in their permanent positions during the early summer. Otherwise, either put them in a sheltered nursery bed, or keep them in their pots in a sheltered position and plant them out in spring of the following year. Division of suckers in spring or autumn. Very easy.

nwatta Tolerates most soils, including chalk[200], but prefers a moist loamy soil[11, 200]. Grows well in heavy clay soils. Tolerates some shade but is best in a sunny position[1]. Tolerates atmospheric pollution and coastal situations[200]. A very invasive plant, sending up new shoots a metre or more away[K]. It can be used for naturalising in the rougher parts of the garden[233], growing well on rough banks etc[1]. The whole plant, when bruised, emits a most unpleasant fur-like smell[245]. The bark, in particular, smells like stale perspiration[245].

drutta *Spiraea salicifolia* is a deciduous Shrub growing to 1.8 m (6ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves OilEdible Uses: OilYoung leaves - cooked[177]. Rich in vitamin C[105].

tcanta Hedge Hedge Oil Soil stabilizationA soil stabilizer for river and lakeside banks[200]. Plants are frequently planted in hedges[17].

dwatta Astringent Pectoral Vitamin CThe roots have been used in the treatment of coughs and chest colds[257]. Immature seeds have been used in the treatment of diarrhoea with blood[257].

nrakta Europe to E. Asia. Naturalized in Wales and N. Britain[17]. ksacta Wet boggy places in the mountains of N. Japan[58]. More or less naturalized in woods in Wales and N. England[17].

propta Seed - we have no information for this species but suggest sowing the seed as soon as it is ripe in a cold frame if possible. It is likely to require stratification before it germinates, so stored seed should be sown in a cold frame as early in the year as you receive it. Prick out the seedlings into individual pots when they are large enough to handle, and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a light sandy soil a frame. Cuttings of mature wood of the current seasons growth, 15cm long, October/November in an outdoor frame[200]. Another report says that September is a good time to do this[11]. Division of suckers in early spring[200]. They can be planted out straight into their permanent positions.

nwatta Tolerates most soils[200], but prefers a good loamy soil, abundant moisture and full sunlight[11, 200]. Prefers a moist lime-free soil[182], plants quickly become chlorotic on chalk soils[200]. A very cold hardy plant, tolerating temperatures down to about -25°C[184]. Hybridizes freely with other members of this genus[11]. A rampant suckering shrub, it quickly produces dense thickets[182]. It is apt to get thin and poor unless divided up fairly regularly and replanted in fairly good soil[1].

5.2.544 *Euonymus macropterus*

4 tlin 8 cyuc 1 kcaok 0 tcan 0 dwat m hkuc hmimhtut cyutli kyucctup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Euonymus macropterus* is a deciduous Shrub growing to 4 m (13ft 1in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Although no records of toxicity have been seen for this species, a number of plants in this genus are suspected of being poisonous and so some caution is advised.

kcakta Edible Parts: LeavesEdible Uses: Young leaves - boiled[105, 177]. Some caution is advised, see the notes above on possible toxicity.

nrakta E. Asia - Japan, Korea, Manchuria. ksacta Mixed and coniferous forests and thickets in the mountains of C. and N. Japan[58].

propta Seed - best sown as soon as it is ripe in a cold frame[121]. Stored seed requires 3 months cold stratification, so should be sown as early in the year as possible in a cold frame[113]. The seed can take 18 months to germinate. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5 - 7cm long taken at a node or with a heel, July/August in a frame. Very easy[200].

nwatta Thriving in almost any soil, including chalk, it is particularly suited to dry shaded areas[200]. Prefers a well-drained loamy soil[11]. Plants are hardy to about -25°C[184].

5.2.545 *Cimicifuga simplex*

4 tlin 8 cyuc 1 kcaok 0 tcan 0 dwat 1.5 m hkuc hmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Cimicifuga simplex* is a PERENNIAL growing to 1.5 m (5ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in October, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

pcista Although no specific mention of toxicity has been seen for this species, it does belong to a family that contains a number of toxic species and at least one species in this genus is said to be mildly poisonous. Some caution is therefore advised.

kcakta Edible Parts: LeavesEdible Uses: CondimentLeaves - cooked[105, 177, 183]. Some caution is advised, see the notes above on toxicity. The fragrant root is used as a spice[183].

nrakta E. Asia - Japan, Dahurica. ksacta Mountain meadows and alpine regions all over Japan[58]. Forest margins, scrub, grassy slopes and open lands at elevations of 300 - 3200 metres[266].

propta Seed - best sown as soon as it is ripe in a cold frame[1]. Only just cover the seed. It germinates in 1 - 12 months or even longer at 15°C[164]. The seed does not store well and soon loses its viability[200], stored seed may germinate better if given 6 - 8 weeks warm stratification at 15°C and then 8 weeks cold stratification[164]. Prick out the young seedlings into individual pots when they are large enough to handle and grow them on in a frame for their first winter. Plant out in late spring or early summer[K]. Division in spring or autumn[1]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the summer or following spring.

nwatta Prefers a moist humus rich soil and some shade[1, 200]. Succeeds in ordinary garden soil[1]. Grows well in the dappled shade of woodland[88]. Plants are hardy to at least -25°C[187]. A number of named varieties have been selected for their ornamental value[187]. A good bee and butterfly plant[88]. The flowers have an unusual, slightly unpleasant smell[188]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

5.2.546 *Rumex obtusifolius*

Round-Leaved Dock, Bitter dock

4 tlin 8 cyuc 1 kcaok 3 tcan 2 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatprikliwisslip hpa7tmwatli xre7t hjonli

drutta *Rumex obtusifolius* is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to October, and the seeds ripen from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Plants can contain quite high levels of oxalic acid, which is what gives the leaves of many members of this genus an acid-lemon flavour. Perfectly alright in small quantities, the leaves should not be eaten in large amounts since the oxalic acid can lock-up other nutrients in the food, especially calcium, thus causing mineral deficiencies. The oxalic acid content will be reduced if the plant is cooked. People with a

which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. A very ornamental plant, there are some named varieties[1, 11, 200]. Special Features: North American native, Attractive flowers or blooms.

5.2.487 *Cornus sanguinea*

Dogwood, Bloodtwig dogwood

4 tlin 8 cyuc 2 kcaok 0 tcan 1 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikliwisslip hpa7tmwatli xre7t hjonli

drutta *Cornus sanguinea* is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to July, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Contrary to some reports, the fruit is not poisonous, but the leaves can cause skin irritations to sensitive people[65].

kcakta Edible Parts: Fruit Oil OilEdible Uses: Oil Oil-Fruit - raw or cooked[105]. A bitter flavour, it can also have an emetic effect on the body[1, 7, 11]. It is not worthwhile[115]. The fruit is about 8mm in diameter[200]. An oil is obtained from the seed[2], it is edible when refined[75].

tcanta Basketry Charcoal Dye Fuel Hedge Hedge Oil WoodThe seed contains 45% of a non-drying oil[74], it is used in soap making and lighting[7, 13, 100, 115, 177]. A non-drying oil is also obtained from the pericarp, it is used for lighting[74]. The pericarp contains 19 - 35% oil[74]. A greenish-blue dye is obtained from the fruit[13, 74]. The young stems are very flexible and are used in basketry[7, 13, 74, 100]. Wood - tough, hard. Used for small items such as tool handles, turnery etc[11, 61, 115]. A good quality charcoal is obtained from the wood[115], the wood also makes an excellent fuel[115].

dwatta Astringent Emetic FebrifugeThe bark is astringent and febrifuge[7]. It is used to treat fevers[254]. The leaves are sometimes used externally as an astringent[7]. The fruit is emetic[7].

nrakta Europe, including Britain, from Scandinavia to Spain, east to Sicily and Greece. Rare in S.W. Asia.. ksacta Mixed woods, scrub and hedgerows, especially on calcareous soils[7, 13, 186].

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

nwatta An easily grown plant, it succeeds in any soil of good or moderate fertility[1], ranging from acid to shallow chalk[200]. Grows well in heavy clay soils. Plants are relatively shade tolerant, though they are not happy when growing in dense shade[186]. They grow badly when exposed to strong cold winds[186]. Plants are hardy to about -25°C[184]. The flowers have a rather unpleasant smell to most people, though they are attractive to insects[186]. Plants have a suckering habit and can quickly form dense thickets[186]. They can be coppiced regularly and will throw up long straight stems after being cut back[186]. Plants in this genus are notably resistant to honey fungus[200].

5.2.488 *Allium flavum*

Small Yellow Onion, Ornamental Onion

4 tlin 7 cyuc 2 kcaok 0 tcan 2 dwat 0.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Allium flavum* is a BULB growing to 0.5 m (1ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no individual reports regarding this species have been seen, there have been cases of poisoning caused by the consumption, in large quantities and by some mammals, of certain members of this genus. Dogs seem to be particularly susceptible[76].

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Bulb - raw or cooked. The bulb is rather small, about 15mm tall and 10mm in diameter[203]. Leaves - raw or cooked. Flowers - raw.

tcanta Insecticide RepellentThe juice of the plant is used as a moth repellent. The whole plant is said to repel insects and mites[20].

dwatta Although no specific mention of medicinal uses has been seen for this species, members of this genus are in general very healthy additions to the diet. They contain sulphur compounds (which give them their onion flavour) and when added to the diet on a regular basis they help reduce blood cholesterol levels, act as a tonic to the digestive system and also tonify the circulatory system[K].

nrakta Southern and central Europe. ksacta Dry slopes[203].

propta Seed - sow spring in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle - if you want to produce clumps more quickly then put three plants in each pot. Grow them on in the greenhouse for at least their first winter and plant them out into their permanent positions in spring once they are growing vigorously and are large enough. Division of the bulbs in late summer or the autumn. Larger bulbs can be planted straight out into their permanent positions, though it might be best to pot up the smaller bulbs and grow them on for a year before planting them out..

nwatta Landscape Uses:Border. A very easily grown plant, it prefers a sunny position in a light well-drained soil[1, 203]. It succeeds in clay soils and also in areas of higher rainfall, so long as the soil drains fairly well[203]. A very variable species with forms ranging in height from 8 - 50cm[203]. Closely related to *A. carinatum*[203]. The bulbs should be planted fairly deeply[1]. Most members of this genus are intolerant of competition from other growing plants[203]. Grows well with most plants, especially roses, carrots, beet and chamomile, but it inhibits the growth of legumes[18, 20, 54]. This plant is a bad companion for alfalfa, each species negatively affecting the other[201]. Members of this genus are rarely if ever troubled by browsing deer[233]. Special Features: Not North American native, Naturalizing, Suitable for cut flowers, Suitable for dried flowers.

5.2.489 *Populus trichocarpa*

Western Balsam Poplar, Black cottonwood

4 tlin 8 cyuc 1 kcaok 4 tcan 3 dwat 40 m hkuc htut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli frusflatprikliwis hpa7tmwatli nyanhjen hjonli

drutta *Populus trichocarpa* is a deciduous Tree growing to 40 m (131ft) by 12 m (39ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to May, and the seeds ripen from May to June. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly

alkaline) soils and can grow in very acid soils. It cannot grow in the shade. It prefers moist soil.

kaakta Edible Parts: Flowers Inner bark SapEdible Uses: Inner bark - raw or dried. It is usually ground into a powder and used as a flour, this is normally mixed with other flours for making bread etc[172, 177]. It is best used in the spring[172]. The inner bark is mucilaginous[257] and extremely sweet, but it sours or ferments rapidly and so, unlike most inner barks, it cannot be dried for winter use, though it can be sun-dried for more immediate use[256]. Catskins - raw or cooked. A bitter flavour[172]. Sap - used for food[257].

tcanta Adhesive Basketry Containers Cork Dye Fuel Insulation Paint Rooting hormone Scourer Soap Soap making String Stuffing Waterproofing WoodAn extract of the shoots can be used as a rooting hormone for all types of cuttings. It is extracted by soaking the chopped up shoots in cold water for a day[172]. A yellow dye is obtained from the leaf buds[257]. The bark of large trees is thick and corky. It is made into containers for carrying and storing food, also as a lining for underground food stores[99]. The inner bark has been shredded, spun together with red or yellow cedar inner bark (Thuja plicata, Juniperus spp and Chamacyparis nootkatensis) and used as a twine[257]. A glue is made from the aromatic gum on the spring buds[99, 226, 257]. Very strong, it can also be used as a waterproofing for wood etc[99]. When mixed with pigment it can be used as a paint[99]. A string is made from the roots[99]. The supple young branches have been used as lashings or tying thongs[257]. The seed fluff is used as a stuffing material for pillows etc[99]. The wood ashes are a soap substitute[99], they can also be mixed with oil to make a soap[99]. The white inner bark is also a soap substitute, it can be dried and stored for later use[99]. The inner bark has also been used as a scouring pad[257]. The roots have been used for making baskets[257]. Wood - soft, moderately strong, easily worked, rather woolly in texture, without smell or taste, of low flammability, not durable, very resistant to abrasion. Used in making crates, packing material the staves of barrels, woodenware and for pulp[11, 82, 99, 229]. It makes an excellent fuel[99].

dwatta Anodyne Antiinflammatory Antiscorbutic Antiseptic Balsamic Diuretic Expectorant Febrifuge Stimulant TonicWestern balsam poplar has a long history of herbal use. It was commonly used by many native North American Indian tribes who valued it especially for its antiseptic and expectorant properties, using it to treat lung complaints, wounds, skin conditions etc[257]. It is still commonly employed in modern herbalism with much the same uses. The leaf buds are covered with a resinous sap that has a strong turpentine odour and a bitter taste[213]. They also contain salicin, a glycoside that probably decomposes into salicylic acid (aspirin) in the body[213]. The buds are antiscorbutic, antiseptic, balsamic, diuretic, expectorant, stimulant and tonic[4, 226, 238]. They are taken internally in the treatment of bronchitis and upper respiratory tract infections. They should not be prescribed to patients who are sensitive to aspirin[238]. Externally, the buds are used to treat colds, sinusitis, arthritis, rheumatism, muscular pain and dry skin conditions[238]. They can be put in hot water and used as an inhalant to relieve congested nasal passages[213]. The buds are harvested in the spring before they open and are dried for later use[238]. Although no specific mention has been seen for this species, the bark of most, if not all members of the genus contain salicin, a glycoside that probably decomposes into salicylic acid (aspirin) in the body[213, 238]. The bark is therefore anodyne, anti-inflammatory and febrifuge. It is used especially in treating rheumatism and fevers, and also to relieve the pain of menstrual cramps[238].

nrakta Western N. America - Alaska to Oregon. ksacta Moist woods, ravines, shores, prairies and park lands[204].

propta Seed - must be sown as soon as it is ripe in spring[113]. Poplar seed has an extremely short period of viability and needs to be sown within a few days of ripening[200]. Surface sow or just lightly cover the seed in trays in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the old frame. If sufficient growth is made, it might be possible to plant them out in late summer into their permanent positions, otherwise keep them in the cold frame until the following late spring and then plant them out. Most poplar species hybridize freely with each other, so the seed may not come true unless it is collected from the wild in areas

with no other poplar species growing[11]. Cuttings of mature wood of the current season's growth, 20 - 40cm long, November/December in a sheltered outdoor bed or direct into their permanent positions. Very easy. Suckers in early spring[78].

nwatta Industrial Crop: Biomass Management: Coppice Management: Standard Minor Global Crop Other Systems: Irreg. Intercrop Other Systems: SRC Other Systems: Strip intercropA very easily grown plant, it does well in a heavy cold damp soil[1]. Prefers a deep rich well-drained circumneutral soil, growing best in the south and east of Britain[11, 200]. Growth is much less on wet soils, on poor acid soils and on thin dry soils[11] but this species is more tolerant of acid soils than other members of the genus[11]. It dislikes shade and is intolerant of root or branch competition[11, 200]. Plants are reasonably wind resistant, but they do not grow well in exposed upland sites[11]. Many forms of this species are susceptible to bacterial canker, the female clone 'Fritzi Pauley' is resistant[11, 200]. A very fast growing[11] and ornamental tree[1], it does well in western Britain where trees have reached 25 metres tall in 20 years[11]. The leaf buds, as they swell in the spring, and the young leaves have a pleasing fragrance of balsam[245]. The fragrance is especially pronounced as the leaves unfold[245]. Poplars have very extensive and aggressive root systems that can invade and damage drainage systems. Especially when grown on clay soils, they should not be planted within 12 metres of buildings since the root system can damage the building's foundations by drying out the soil[11]. Dioecious. Male and female plants must be grown if seed is required.

5.2.490 Platanus occidentalis

Buttonwood, American sycamore, American Planetree, Sycamore, American Sycamore

4 tin 9 cyuc 1 kcaak 0 tcan 2 dwat 30 m hkuc htuc cyutli hgattcuphja7n hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli hjonli

drutta Platanus occidentalis is a deciduous Tree growing to 30 m (98ft) by 30 m (98ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in May, and the seeds ripen from October to March. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

pcista In hot dry climates the hairs of the fruits and leaves are believed to cause an effect similar to hay fever[11, 200].

kaakta Edible Parts: SapEdible Uses: SweetenerThe sweet sap is tapped in the spring and used in the preparation of syrup and sugar[105, 177, 183].

tcanta Shelterbelt WoodA fairly wind resistant tree, it can be grown as part of a shelterbelt planting[200]. Wood - coarse-grained, tough, strong, very durable, difficult to split[46, 61, 171]. Rather weak according to other reports[227, 229]. It weighs 35lb per cubic foot[235], and is used for furniture, chopping boards etc[46, 61, 171, 229]. Trunks of wild trees can be up to 4.5 metres in diameter and these were at one time hollowed out to make barges capable of carrying several tons of goods[226].

dwatta Antirheumatic Astringent Diuretic Dysentery Emetic Laxative Poulitice SalveThe inner bark is astringent, diuretic, emetic and laxative[222]. It has been used as a tea in the treatment of dysentery, coughs, colds, lung ailments, haemorrhages, measles, milky and difficult urination etc and also as a blood tonic[222, 257]. Externally, it has been used as a wash on wounds[257]. An infusion of the bark and roots has been used as a foot soak for treating rheumatism[257]. The bark ooze has been used as a wash on infected sores and an infusion has been given in the treatment of infant rash[257]. An infusion of the bark, mixed with honey locust bark (Gleditsia triacanthos), has been used as a gargle to treat hoarseness and sore throat[257].

nrakta Eastern N. America - New England to Florida, west to Texas and Nebraska. ksacta Rich soils on the borders of streams and lakes[43, 82]. Often abundant on alluvial soils

E Monographs, a therapeutic guide to herbal medicine, approve Gentiana lutea as a tonic (see [302] for critics of commission E).

nrakta C. and S. Europe. ksacta Grassy alpine and sub-alpine pastures, usually on calcareous soils[9, 50].

propta Seed - best sown as soon as it is ripe in a light position in a cold frame[200]. It can also be sown in late winter or early spring but the seed germinates best if given a period of cold stratification and quickly loses viability when stored, with older seed germinating slowly and erratically[200, 239]. It is advantageous to keep the seed at about 10°C for a few days after sowing, to enable the seed to imbibe moisture[239]. Following this with a period of at least 5 - 6 weeks with temperatures falling to between 0 and -5°C will usually produce reasonable germination[239]. It is best to use clay pots, since plastic ones do not drain so freely and the moister conditions encourage the growth of moss, which will prevent germination of the seed[239]. The seed should be surface-sown, or only covered with a very light dressing of compost. The seed requires dark for germination, so the pots should be covered with something like newspaper or be kept in the dark[239]. Pot up the seedlings into individual pots as soon as they are large enough to handle and grow on in light shade in the greenhouse for at least their first winter. The seedlings grow on very slowly, taking 2 - 7 years to reach flowering size[239]. When the plants are of sufficient size, place them out into their permanent positions in late spring or early summer. Cuttings of basal shoots in late spring[238].

nwatta In general, gentians require a moist well-drained soil in a sheltered position, a certain minimum of atmospheric humidity, high light intensity but a site where temperatures are not too high[239]. They are therefore more difficult to grow in areas with hot summers and in such a region they appreciate some protection from the strongest sunlight[200, 239]. Most species will grow well in the rock garden[200]. This species is easily grown in any good garden soil so long as it is deep enough to accommodate its roots[187, 239], though it prefers alkaline conditions[238]. It prefers full sun but succeeds in partial shade[111]. A slow-growing plant, it takes many years to reach its full stature[239]. A moisture loving plant, growing well with water, it prefers to grow with full exposure to the sun but with plenty of underground moisture in the summer and it grows better in the north and west of Britain[1]. Plants are very deep-rooted and are intolerant of root disturbance[4, 200]. They are very long lived, to 50 years or more[9]. A very ornamental plant[1], it takes about 3 years to reach flowering size from seed[4]. Cultivated as a medicinal plant in Europe[4, 57].

5.2.541 Sanguisorba obtusa

Japanese burnet

4 tin 9 cyuc 1 kcaak 0 tcan 0 dwat 1 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Sanguisorba obtusa is a PERENNIAL growing to 1 m (3ft 3in) by 0.6 m (2ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kaakta Edible Parts: LeavesEdible Uses: Leaves - cooked[105]. A famine food, they are only used when all else fails[105].

nrakta E. Asia - Japan. ksacta Damp alpine meadows[187, 200].

propta Seed - sow spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in the spring.

nwatta Succeeds in ordinary garden soil[1]. Prefers a good moist soil that does not dry out in the summer, in sun or partial shade[187, 200]. Hardy to about -20°C[187]. A very ornamental plant[1].

5.2.542 Sorbus sitchensis

Sitka Mountain Ash, Western mountain ash
4 tin 8 cyuc 1 kcaak 0 tcan 1 dwat 1.8 m hkuc hmimhtut cyutli tcup hwicli hyshrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Sorbus sitchensis is a deciduous Shrub growing to 1.8 m (6ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

pcista The seeds probably contain hydrogen cyanide. This is the ingredient that gives almonds their characteristic flavour. Unless the seed is very bitter it should be perfectly safe in reasonable quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kaakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked in pies, preserves etc(62, 105, 161, 183). Of poor quality[256]. The fruit turns sweet and so tastes best after a frost[101]. The fruit is produced in clusters, each fruit being about 6 - 12mm in diameter[229].

tcanta Parasiticide Pioneer WoodThis species is capable of growing in exposed conditions in poor soils[229], and so could be used in re-afforestation as a pioneer plant to provide suitable conditions for other woodland trees to be established[K]. It is rather slow-growing, however, and would only be used in situations where faster species were not so suitable[K]. The berries have been rubbed onto the scalp in order to get rid of lice[257]. Wood - moderately light with little strength, it is of no commercial value[229].

dwatta Antirheumatic Enuresis Kidney Parasiticide StomachicAn infusion of the branches has been given to young children with bed-wetting problems[257]. An infusion of the root and branch bark has been drunk in the treatment of stomach problems and rheumatism[257]. The infusion can also be used externally as a bath for treating rheumatism[257]. A decoction of the root and branch bark has been used as an eyewash[257]. The bark has been chewed in the treatment of colds[257]. An infusion of the branches has been used in the treatment of weak kidneys in order to stop the frequent urination[257].

nrakta Western N. America - Alaska to California, east to Idaho and Montana. ksacta Found mainly on rich moist soils along the borders of streams, or rocky hillsides, usually in association with conifers[229].

propta Seed - best sown as soon as it is ripe in a cold frame[78, 80]. If you have sufficient seed it can be sown in an outdoor seedbed[78, 80]. Stored seed germinates better if given 2 weeks warm then 14 - 16 weeks cold stratification[98], so sow it as early in the year as possible. Prick out the seedlings into individual pots when they are large enough to handle. Seedlings are very slow to put on top-growth for their first year or two[11], but they are busy building up a good root system. It is best to keep them in pots in a cold frame for their first winter and then plant them out into their permanent positions in late spring.

nwatta Succeeds in most reasonably good soils in an open sunny position[11]. Dislikes dry soils[188]. Tolerates light shade[188], though it fruits better in a sunny position[K]. This species is able to succeed in poor soils and to become established on exposed broken ground[229], it is thus suitable for use as a pioneer species in re-establishing woodland[K]. A slow-growing shrub in the wild, it can sometimes become a small tree up to 9 metres tall[229]. It usually produces abundant crops of fruit every year[229]. Plants are susceptible to fireblight[188].

5.2.543 Spiraea salicifolia

Bridewort, Willowleaf meadowsweet

4 tin 8 cyuc 1 kcaak 0 tcan 1 dwat 1.8 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

hardiness. It is hardy to UK zone 4. It is in flower from April to May. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcasta The leaves contain small quantities of hydrogen cyanide (prussic acid). In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: Fruit LeavesEdible Uses: Young leaves - cooked[105, 177]. The leaves contain a small amount (0.002%) of hydrogen cyanide and are also a rich source of vitamin C (200mg per 100g)[218]. Some caution is advised, see the notes above on toxicity. Fruit[177]. No more details are given, but this report is somewhat suspect, the plant does not produce a fleshy fruit and the seed case certainly does not look edible[K]. The fruit is a dry, somewhat plump achene about 5mm in diameter[200].

dwatta Vitamin C Women's complaintsA decoction of the flowering shoots is used in the treatment of coughs and women's complaints[178, 218].

nrakta E. Asia - China, Japan. A rare garden escape in Britain. ksacta By rivers and on rocks in gorges in the mountains[184]. Thickets on mountain slopes at elevations of 200 - 3000 metres[266].

propta Seed - we have no details on this species but suggest sowing the seed as soon as it is ripe in a cold frame. Sow stored seed as soon as possible in a cold frame, it is likely to require a period of cold stratification. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the cold frame for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division of suckers, removed with care from established plants during the dormant season[200]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring. Cuttings of young shoots. Young basal shoots in early summer work quite well. Harvest the shoots when they are about 10 - 15cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer. Layering.

nwatta Landscape Uses:Container, Foundation, Pest tolerant, Massing, Specimen. Succeeds in most aspects in any good loamy soil[1]. Succeeds in very poor soils[202]. Grows well in heavy clay soils. Prefers a moist well-drained soil in a sunny position with shade from the midday sun[200]. Hardy to about -20°C[184]. Plants are moderately fast growing[202]. They sucker freely and can be invasive[202]. Some named forms have been developed for their ornamental value[182]. This species is notably resistant to honey fungus[200]. The flowers are said to be usually unisexual but we do not know if the plants are dioecious or monoecious. Special Features: Not North American native, Attractive flowers or blooms.

5.2.539 Sanguisorba canadensis

American Great Burnet, Canadian burnet

4 tlin 8 cyuc 1 kcaak 0 tcan 0 dwat 1.2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliws hpa7tmwatli xre7t hjonli

drutta Sanguisorba canadensis is a PERENNIAL growing to 1.2 m (4ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from August to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves - boiled, washed in water to remove the bitterness and then eaten with salt and miso[177, 183].

nrakta North-eastern N. America - Newfoundland to Michigan and south to Georgia. ksacta Wet meadows and swamps[187]. Peaty or boggy soils[43].

propta Seed - sow spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in the spring[188].

nwatta Succeeds in ordinary garden soil[1]. Prefers a good moist soil that does not dry out in the summer, in sun or partial shade[187, 200]. Succeeds in the flower border or in moist grass[1], plants can become invasive when they are grown by water[200]. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

5.2.540 Gentiana lutea

Yellow Gentian

4 tlin 8 cyuc 1 kcaak 0 tcan 5 dwat 1.2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliws hpa7tmwatli xre7t hjonli

drutta Gentiana lutea is a PERENNIAL growing to 1.2 m (4ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles, Lepidoptera (Moths and Butterflies). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcasta Contraindicated with gastric or duodenal ulcer patients. Possible headaches, nausea and vomiting [301].

kcakta Edible Parts: Edible Uses: CondimentThe root is sometimes used in the manufacture of gentian bitters[183]. The root contains sugar and mucilage[2] (this is probably a reference to its medicinal properties). The root was occasionally used as a flavouring in beer before the use of hops (*Humulus lupulus*) became widespread[4].

dwatta Anthelmintic Antiinflammatory Antiseptic Appetizer Bitter Cholagogue Emmenagogue Febrifuge Refrigerant Stomachic TonicGentian root has a long history of use as a herbal bitter in the treatment of digestive disorders and is an ingredient of many proprietary medicines. It contains some of the most bitter compounds known and is used as a scientific basis for measuring bitterness[238]. It is especially useful in states of exhaustion from chronic disease and in all cases of debility, weakness of the digestive system and lack of appetite[4]. It is one of the best strengtheners of the human system, stimulating the liver, gall bladder and digestive system[238], and is an excellent tonic to combine with a purgative in order to prevent its debilitating effects[4]. The root is anthelmintic, anti-inflammatory, antiseptic, bitter tonic, cholagogue, emmenagogue, febrifuge, refrigerant and stomachic[4, 7, 9, 14, 21, 165]. It is taken internally in the treatment of liver complaints, indigestion, gastric infections and anorexia[238]. It should not be prescribed for patients with gastric or duodenal ulcers[238]. The root, which can be as thick as a person's arm and has few branches[239], is harvested in the autumn and dried for later use[4]. It is quite likely that the roots of plants that have not flowered are the richest in medicinal properties[4]. The German Commission

near streams and lakes and in moist ravines, sometimes on uplands, sometimes on limestone soils[270].

propta Seed - two months cold stratification improves germination[113]. Sow spring in a cold frame in light shade[78, 98]. Home grown seed is often of poor quality and low viability. It is best to harvest the seed in late winter or spring and then sow it immediately in a cold frame[80]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of mature wood of the current years growth, 20 - 30 cm with a heel, autumn in a cold frame[1]. Easy[200]. Layering of stools in spring or autumn. Takes 12 months[78].

nwatta Landscape Uses:Aggressive surface roots possible, Pollard, Seashore, Specimen, Street tree. Prefers a deep moist loam[1], though it tolerates very wet, poorly drained soils[229]. Requires full sun[200]. Tolerates atmospheric pollution and compacted soils[200]. Established plants are drought tolerant[200]. Fairly wind-resistant[200]. A fast-growing and long-lived tree[200, 229], but it is of no value in Britain, being very susceptible to attack by parasitic fungi[11]. Fairly slow-growing according to another report, which also says that the tree is long-lived in the wild[227]. This species does not do well north of Central France, it requires long hot summers to fully ripen its wood[200]. Special Features:Attracts birds, North American native, Inconspicuous flowers or blooms.

5.2.491 Liriodendron tulipifera

Tulip Tree, Tulip Poplar, Yellow Poplar, Canary Whitewood 4 tlin 9 cyuc 1 kcaak 0 tcan 2 dwat 30 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliws hpa7tmwatli xre7t hjonli

drutta Liriodendron tulipifera is a deciduous Tree growing to 30 m (98ft) by 12 m (39ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from June to July and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Beetles. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Edible Uses: CondimentThe root is used as a lemon-like flavouring in spruce beer, where it also serves to correct the bitterness of the beer[2]. The bark of the root and branches have a pleasant rather pungent scent[11].

tcanta Dye WoodA gold-coloured dye is obtained from the bark[106]. Wood - fine grained, soft, light, easily worked, durable, brittle, not strong but does not split. A valuable timber, it weighs 26lb per cubic foot and is much used for interior finishes, furniture, construction and plywood[11, 46, 61, 171, 229, 235]. Native north americans used the tree for making canoes[270].

dwatta Anthelmintic Aphrodisiac Cardiac Diuretic Dysentery Nerve Poultice TonicThe intensely acrid bitter inner bark, especially of the roots, is used domestically as a diuretic, tonic and stimulant[82, 213]. The raw green bark is also chewed as an aphrodisiac[222, 257]. The bark contains 'tulipiferine', which is said to exert powerful effects on the heart and nervous system[46, 61, 213]. A tea is used in the treatment of indigestion, dysentery, rheumatism, coughs, fevers etc[222, 257]. Externally, the tea is used as a wash and a poultice on wounds and boils[257]. The root bark and the seeds have both been used to expel worms from the body[213, 257].

nrakta Eastern N. America - Nova Scotia to Florida. ksacta Deep rich rather moist soils on mountain slopes and by streams[82]. Rich woodlands, bluffs, low mountains, and hills from sea level to 1500 metres[270].

propta Seed - best sown as soon as it is ripe in a shady place in a cold frame[80, 113, 200]. Stored seed requires 3 weeks warm then 12 weeks cold stratification[80, 113]. Germination is usually poor, only about 1% of the seed is viable[80]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, af-

ter the last expected frosts[78]. Layering in spring. Do not sever from the parent plant for 2 years[200].

nwatta Landscape Uses:Pest tolerant, Aggressive surface roots possible, Pollard, Specimen. Requires a deep rich soil[11, 43, 200] and a sheltered but not overshadowed position[1]. Prefers a slightly acid soil[188]. Succeeds in sun or semi-shade[188]. A very ornamental plant[1], it is fast-growing and moderately long-lived in its native range[229]. Flowers are first produced when the tree is about 15 - 20 years old[229]. Liriodendron tulipifera is the state tree of both Indiana and Tennessee[270]. Intolerant of root disturbance, plants are best grown in pots and placed into their final positions as soon as possible. Any transplanting is best done in May[11]. Trees flower best in regions with long hot summers[200]. Plants are particularly susceptible to attacks by rabbits and hares[200]. The flowers produce considerable nectar, making this a good bee plant[21, 229]. Cultivated for its wood in Europe[50]. Special Features:North American native, Attracts butterflies, Fragrant flowers, Attractive flowers or blooms.

5.2.492 Fraxinus americana

White Ash

4 tlin 9 cyuc 1 kcaak 0 tcan 2 dwat 25 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatprikliwssip hpa7tmwatli nyanhjen hjonli

drutta Fraxinus americana is a deciduous Tree growing to 25 m (82ft) by 15 m (49ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from April to May, and the seeds ripen in September. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: Edible Uses: DrinkA bitter tasting syrup is drawn from the tree[226]. The report gives no more details and does not directly say that the syrup was used as food. It was quite possibly only used medicinally[K].

tcanta Dye Repellent Shelterbelt WoodThe leaves are said to repel rattlesnakes and have been worn on the feet of people travelling in rattlesnake country[213]. There are some doubts over the efficacy of this[213]. A yellow dye is obtained from the bark[226]. Wood - strong, hard, heavy, tough, elastic, close grained, moderately durable[46, 82, 227]. It weighs 41lb per cubic foot, seasons well, takes a good polish and is shock resistant[227]. One of the most valuable of the North American timbers[82, 226], it is much used for tool handles, hockey sticks, baseball bats, the interior of buildings, musical instruments, furniture, woodenware etc[46, 82, 227, 274]. As a fuel it is comparable in quality to such excellent species as oak (*Quercus* spp) and hickory (*Carya* spp)[226].

dwatta Aphrodisiac Astringent Bitter Stings TonicThe bark is astringent, emmenagogue and a bitter tonic[46, 61, 254, 257]. An infusion is used to promote menstruation[257]. It has also been used as a wash to treat skin sores, itches and vermin on the scalp[213, 257]. The inner bark is diaphoretic, diuretic, emetic and strongly laxative[222]. It is used as a tea to remove bile from the intestines, as a tonic after childbirth and to relieve stomach cramps and fevers[222, 257]. It is chewed and applied as a poultice to sores[222]. The leaves are used to soothe the itching caused by mosquito bites and bee stings[229]. The seeds are thought to be aphrodisiac[222].

nrakta Eastern N. America - Nova Scotia to Florida, west to Nebraska and Texas. ksacta Rich upland to lowland woods[43, 82]. Usually found in association with other hardwood trees in well-drained soils on slopes[227].

propta The seed is best harvested green - as soon as it is fully developed but before it has fully dried on the tree - and can then be sown immediately in a cold frame[80]. It usually germinates in the spring[80]. Stored seed requires a period of cold stratification and is best sown as soon as

possible in a cold frame[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant them out into their permanent positions or a nursery bed in late spring or early summer of the following year. If you have sufficient seed then it is possible to sow it directly into an outdoor seedbed, preferably in the autumn. Grow the seedlings on in the seedbed for 2 years before transplanting either to their permanent positions or to nursery beds.

nwatta Landscape Uses:Firewood, Aggressive surface roots possible, Pollard, Street tree. Prefers a deep loamy soil, even if it is on the heavy side[1, 200]. Most members of this genus are gross feeders and require a rich soil[200]. Succeeds in exposed positions[200] and in alkaline soils[11]. Tolerates atmospheric pollution[200]. Young plants tolerate forest shade[226]. One of the most valuable hardwood timber trees in N. America[226], saplings grow slowly at first, but the growth rate speeds up over the next 50 years[229]. This species is planted on a small scale, mainly in E. Europe, as a timber tree[50]. It has the potential as a forestry tree in Britain, succeeding under conditions that are too dry or frosty for the native ash, *F. excelsior*[11]. A very ornamental tree[1], it is often confused in cultivation with *F. pennsylvanica*[50]. Dioecious. Male and female plants must be grown if seed is required. Male trees usually flower heavily each year, but female trees only flower heavily every 2 - 3 years[229]. Special Features: North American native, Attracts butterflies, Inconspicuous flowers or blooms.

5.2.493 *Ulmus villosa*

Cherry Bark Elm
4 tlin 8 cyuc 1 kcaak 0 tcan 0 dwat 25 m hkuc
hmmihmtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliws hpa7tmwatli xre7t hjonli

drutta *Ulmus villosa* is a deciduous Tree growing to 25 m (82ft 0in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked.

tcanta WoodWood - hard, somewhat scented. Used for furniture[146].

nrakta E. Asia - Himalayas. ksacta Found at altitudes up to 3500 metres in the Himalayas[146].

propta Seed - if sown in a cold frame as soon as it is ripe, it usually germinates within a few days[200]. Stored seed does not germinate so well and should be sown in early spring[200]. The seed can also be harvested 'green' (when it has fully developed but before it dries on the tree) and sown immediately in a cold frame. It should germinate very quickly and will produce a larger plant by the end of the growing season[80]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Plants should not be allowed to grow for more than two years in a nursery bed since they form a tap root and will then move badly. Layering of suckers or coppiced shoots[200].

nwatta Prefers a fertile soil in full sun[188], but is easily grown in any soil of at least moderate quality so long as it is well drained[1]. Susceptible to 'Dutch elm disease', a disease that has destroyed the greater part of all the elm trees growing in Britain. The disease is spread by means of beetles. There is no effective cure (1992) for the problem, but most E. Asian, though not Himalayan, species are resistant (though not immune) to the disease so the potential exists to use these resistant species to develop new resistant hybrids with the native species[200]. The various species of this genus hybridize freely with each other and pollen is easily saved, so even those species with different flowering times can be hybridized[200].

5.2.494 *Populus sieboldii*

Japanese Aspen
4 tlin 8 cyuc 1 kcaak 2 tcan 1 dwat 20 m hkuc
htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliws hpa7tmwatli nyanhjen hjonli

drutta *Populus sieboldii* is a deciduous Tree growing to 20 m (65ft 7in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young leaves and young shoots - cooked[105, 177].

tcanta Rooting hormone WoodAn extract of the shoots can be used as a rooting hormone for all types of cuttings. It is extracted by soaking the chopped up shoots in cold water for a day[172]. Wood - soft, rather woolly in texture, without smell or taste, of low flammability, not durable, very resistant to abrasion[11].

dwatta Anodyne Antiinflammatory FebrifugeAlthough no specific mention has been seen for this species, the bark of most, if not all members of the genus contain salicin, a glycoside that probably decomposes into salicylic acid (aspirin) in the body[213, 238]. The bark is therefore anodyne, anti-inflammatory and febrifuge. It is used especially in treating rheumatism and fevers, and also to relieve the pain of menstrual cramps[238].

nrakta E. Asia - Japan. ksacta Mountains all over Japan[58].

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

nwatta An easily grown plant, it does well in a heavy cold damp soil[1]. Prefers a deep rich well-drained circum-neutral soil, growing best in the south and east of Britain[11, 200]. Growth is much less on wet soils, on poor acid soils and on thin dry soils[11]. It does not do well in exposed upland sites[11]. It dislikes shade and is intolerant of root or branch competition[200]. Poplars have very extensive and aggressive root systems that can invade and damage drainage systems. Especially when grown on clay soils, they should not be planted within 12 metres of buildings since the root system can damage the building's foundations by drying out the soil[11]. Dioecious. Male and female plants must be grown if seed is required. Hybridizes freely with other members of this genus[200].

5.2.495 *Tsuga canadensis*

Canadian Hemlock, Eastern hemlock
4 tlin 7 cyuc 1 kcaak 0 tcan 3 dwat 20 m hkuc
pcimhmmhtut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatprikliws hpa7tmwatli hjonli

drutta *Tsuga canadensis* is an evergreen Tree growing to 20 m (65ft) by 8 m (26ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in leaf all year, in flower in May, and the seeds ripen from November to February. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can

the treatment of 'cold' headache, general body aches, pruritis, irregular menstruation and other gynaecological diseases[147]. Plants contain the anticancer compound dulcitol[218].

nrakta E. Asia - Japan. ksacta Thickets and woods in lowland and mountains all over Japan[58].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed requires 8 - 12 weeks warm followed by 8 - 16 weeks cold stratification and can then be sown in a cold frame[78, 98]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5 - 8cm long taken at a node or with a heel, July/August in a frame. Very easy[200].

nwatta Landscape Uses:Border, Erosion control, Foundation, Hedge, Massing, Screen, Standard, Specimen. Thrives in almost any soil, including chalk[200], it is particularly suited to dry shaded areas[200]. Prefers a well-drained loamy soil[1]. A very ornamental and cold-tolerant plant[1], it tolerate temperatures down to about -25°C[184]. There are some named varieties developed for their ornamental value[182]. 'Compactus' is a more dense growing form for small gardens[182]. Special Features:Not North American native, Invasive, All or parts of this plant are poisonous, Inconspicuous flowers or blooms.

5.2.535 *Spiraea prunifolia*

Bridalwreath Spiraea
4 tlin 8 cyuc 1 kcaak 0 tcan 1 dwat 2.5 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliws hpa7tmwatli xre7t hjonli

drutta *Spiraea prunifolia* is a deciduous Shrub growing to 2.5 m (8ft) by 2.5 m (8ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young leaves - cooked[105, 177].

dwatta Emetic MalariaThe plant is emetic[218]. It is used in the treatment of malaria and fever[218].

nrakta E. Asia - E. China, Korea, Taiwan. ksacta Sunny hillsides to 1500 metres[184]. Stony and barren places in C. and S. Korea[151].

propta Seed - we have no information for this species but suggest sowing the seed as soon as it is ripe in a cold frame if possible. It is likely to require stratification before it germinates, so stored seed should be sown in a cold frame as early in the year as you receive it. Prick out the seedlings into individual pots when they are large enough to handle, and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a light sandy soil a frame. Cuttings of mature wood of the current seasons growth, 15cm long, October/November in an outdoor frame[200]. Another report says that September is a good time to do this[11]. Division of suckers in early spring[200]. They can be planted out straight into their permanent positions.

nwatta Tolerates most soils[200], but prefers a good loamy soil, abundant moisture and full sunlight[11, 200]. Hardy to about -20°C[184]. Hybridizes freely with other members of this genus[11]. Flowers are produced on the previous seasons growth and any pruning is best done immediately after flowering in order to promote new growth and plenty of flowers in the following year[182]. This species is notably resistant to honey fungus[200]. Special Features: Not North American native, Fragrant flowers, Blooms are very showy.

5.2.536 *Euonymus oxyphyllus*

4 tlin 8 cyuc 1 kcaak 0 tcan 1 dwat 2.5 m hkuc
hmmihmtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flat-

prikliws hpa7tmwatli xre7t hjonli

drutta *Euonymus oxyphyllus* is a deciduous Tree growing to 2.5 m (8ft) by 2.5 m (8ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in May, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Although no records of toxicity have been seen for this species, a number of plants in this genus are suspected of being poisonous and so some caution is advised.

kcakta Edible Parts: LeavesEdible Uses: Young leaves - boiled[105, 177]. Some caution is advised, see the notes above regarding possible toxicity.

tcanta WoodWood - hard, elastic, very fine grained. Used for stamps, printing blocks, mosaics etc[46, 61].

dwatta Women's complaintsThe plant is used in gynaecological applications[218].

nrakta E. Asia - China, Japan, Korea. ksacta Thickets and woods in low mountains all over Japan[58].

propta Seed - best sown as soon as it is ripe in a cold frame[121]. Stored seed requires 3 months cold stratification, so should be sown as early in the year as possible in a cold frame[113]. The seed can take 18 months to germinate. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5 - 7cm long taken at a node or with a heel, July/August in a frame. Very easy[200].

nwatta Thriving in almost any soil, including chalk, it is particularly suited to dry shaded areas[200]. Prefers a well-drained loamy soil. A very ornamental plant[11], it is hardy to about -25°C[184]. A slow growing plant, though it makes a large shrub in time[182].

5.2.537 *Sanguisorba stipulata*

4 tlin 8 cyuc 1 kcaak 0 tcan 1 dwat 2 m hkuc
hmmihmtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatprikliws hpa7tmwatli xre7t hjonli

drutta *Sanguisorba stipulata* is a PERENNIAL growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 4. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves - cooked. They are not choice[172].

dwatta AstrigentBoth the roots and the leaves are astringent[172].

nrakta Western N. America - Alaska to Oregon. ksacta Bogs, swamps and streambanks[60].

propta Seed - sow spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the cold frame for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in the spring.

nwatta Succeeds in ordinary garden soil[1]. Prefers a good moist soil that does not dry out in the summer, in sun or partial shade[187, 200]. Very closely related to *S. canadensis*[60], and considered to be no more than part of that species by some botanists[200].

5.2.538 *Kerria japonica*

Bachelor's Button, Japanese rose, Jew's Mallow, Japanese Kerria
4 tlin 9 cyuc 1 kcaak 0 tcan 1 dwat 2 m hkuc
hmmihmtut cyutli tcup hwicli hyishrasjlutnyikfrip hpa7tli flatprikliws hpa7mwatli hjonli

drutta *Kerria japonica* is a deciduous Shrub growing to 2 m (6ft) by 2 m (6ft) at a medium rate. See above for USDA

diate forms are always found where two taxa approximate geographically[266].

5.2.532 *Euonymus atropurpureus*

Wahoo - Indian Arrow Wood - Burning Bush, Eastern wahoo 4 tin 8 cyuc 1 kcaak 0 tcan 2 dwat 2.5 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flat-prikliwis hpa7tmwatli xre7t hjonli

drutta *Euonymus atropurpureus* is a deciduous Shrub growing to 2.5 m (8ft 2in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in June, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista The fruits, seed and bark are considered to be poisonous[222]. Adverse effects include diarrhoea, vomiting, chills, seizures, syncope and weakness. Toxic in excessive doses [301].

kcaakta Edible Parts: FruitEdible Uses: Although the fruit has sometimes been eaten, it is considered to be poisonous by some writers and so should definitely be avoided[213]. The fruit is about 15mm in diameter[200].

tcanta WoodWood - heavy, hard, tough, very close grained[82, 227]. It weighs 41lb per cubic foot[227], but is too small to be of commercial value[229].

dwatta Alternative Cardiac Cathartic Cholagogue Diuretic Eczema Emetic Expectorant Hepatic Malaria TonicWahoo was used in various ways by the North American Indians, for example as an eye lotion, as a poultice for facial sores and for gynaecological conditions[254]. In current herbalism it is considered to be a gallbladder remedy with laxative and diuretic properties[254]. The bark, however, is toxic and should only be used under professional supervision, it should not be given to pregnant women or nursing mothers[254]. The stem and root bark is alterative, cardiac, cathartic, cholagogue, diuretic, expectorant, hepatic, laxative, stimulant and tonic[4, 21, 46, 61, 222]. The root bark is the part normally used, though bark from the stems is sometimes employed as a substitute[4]. In small doses it stimulates the appetite, in larger doses it irritates the intestines[4]. The bark is especially useful in the treatment of biliousness and liver disorders which follow or accompany fevers[4, 254] and for treating various skin disorders such as eczema which could arise from poor liver and gallbladder function[254]. It is also used as a tea in the treatment of malaria, liver congestion, constipation etc[222]. The powdered bark, applied to the scalp, was believed to eliminate dandruff[222]. The bark and the root contain digitoxin and have a digitalis-like effect on the heart[213, 222]. They have been used in the treatment of heart conditions[254]. The bark, which has a sweetish taste, is gathered in the autumn and can be dried for later use[213]. A tea made from the roots is used in cases of uterine prolapse, vomiting of blood, painful urination and stomach-aches[222]. The seed is emetic and strongly laxative[222].

nrakta Eastern N. America - Ontario to Florida, Montana, Oklahoma and Nebraska. ksacta Rich woods and thickets[43], the best specimens are found in deep rich humus soils[229]. Limestone soils, stream bottoms and woods in Texas[274].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed requires 8 - 12 weeks warm followed by 8 - 16 weeks cold stratification and can then be sown in a cold frame[78, 98]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5 - 8cm long taken at a node or with a heel, July/August in a frame. Very easy[200].

nwatta Thrives in almost any soil, including chalk, it is particularly suited to dry shaded areas[200]. Prefers a well-drained loamy soil[1]. Requires shade from the midday sun[1, 11]. A moderately fast-growing but short-lived tree in the wild[229].

5.2.533 *Senecio cannabifolius*

Aleutian ragwort

4 tin 8 cyuc 1 kcaak 0 tcan 2 dwat 2 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Senecio cannabifolius* is a PERENNIAL growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 5. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista Although no mention of toxicity has been seen for this species, it belongs to a genus that contains a number of plants with a cumulative poisonous effect on the liver[65]. Some caution is advised.

kcaakta Edible Parts: LeavesEdible Uses: Leaves and stems - cooked[46, 61, 105]. A bitter taste should be removed by leaching the leaves or cooking them in more than one change of water[177]. Some caution is advised, see the notes above on toxicity.

dwatta Anodyne Antirheumatic Contraceptive SkinThe plant (though the part used is not specified) is anodyne, antirheumatic, contraceptive and used in the treatment of skin complaints. It stimulates the circulation[147, 178]. A decoction is used in the treatment of amenorrhoea, abdominal distension and cramps, traumatic injuries, bruises and swellings[147].

nrakta E. Asia - China, Japan, Siberia. ksacta Mountains of N. Japan.

propta Seed - sow spring in a greenhouse and only just cover the seed. Make sure the compost does not dry out. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in early summer if they have grown sufficiently. Otherwise, grow them on in the greenhouse or cold frame for their first winter and plant them out the following year after the last expected frosts. Division in spring[200]. Root cuttings in early spring[200].

nwatta Succeeds in a sunny position in most moderately fertile well-drained soils[200].

5.2.534 *Euonymus alatus*

Winged Spindle Tree, Burningbush, Corky spindletree 4 tin 8 cyuc 1 kcaak 0 tcan 2 dwat 2 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flat-prikliwis hpa7tmwatli xre7t hjonli

drutta *Euonymus alatus* is a deciduous Shrub growing to 2 m (6ft) by 3 m (9ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to August, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Although no records of toxicity have been seen for this species, a number of plants in this genus are suspected of being poisonous and so some caution is advised.

kcaakta Edible Parts: Fruit LeavesEdible Uses: TeaYoung leaves, boiled[105, 177]. The fruit may be edible[105, 177]. No further details are given, though we would recommend caution in eating any member of this genus[K]. The fruit is about 8mm in diameter[200]. The seed contains 20.5% protein, 44.4% fat and 3.9% ash[218]. These reports of edibility should be treated with some caution, see the notes above on toxicity. The flowers are a tea substitute[178, 218].

tcanta Hedge HedgeThis species can be grown as a hedge, the var. *compactus* is normally used[29].

dwatta Anodyne Anthelmintic Antiphlogistic Antipruritic Astringent Blood tonic Cancer Carminative Emmenagogue HypoglycaemicThe stem and branches are alterative, analgesic, anodyne, anthelmintic, anticoagulant, antiphlogistic, antipruritic, astringent blood tonic, carminative, emmenagogue, hypoglycaemic, and purgative[147, 178, 218, 279]. It is used in Korea to treat intestinal worms, suppressed menstruation and cancer[279]. A decoction is used in China in

grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

kcaakta Edible Parts: Inner barkEdible Uses: Condiment TeaInner bark - raw or cooked[213]. Usually harvested in the spring[2], it can be dried, ground into a powder and then used as a thickening in soups etc or mixed with cereals when making bread[2, 46, 161]. An emergency food, it is only used when all else fails[183]. The leaves and twigs yield 'spruce oil', used commercially to flavour chewing gum, soft drinks, ice cream etc[183]. A herbal tea is made from the young shoot tips[2, 62, 95, 159, 183, 257]. These tips are also an ingredient of 'spruce beer'[183].

tcanta Basketry Dye Hedge Hedge Resin Rust Tannin WoodYields a resin similar to *Abies balsamea*, it is gathered by incisions in the trunk or by boiling the wood[46, 61, 64]. A pitch (called hemlock pitch), is obtained by distillation of the young branches[46]. 'Oil of Hemlock' is distilled from the young branches according to another report[82]. The bark contains 8 - 14% tannin[46, 171, 223]. The inner bark is used according to one report[82]. The inner bark has been used in making baskets[257]. A red to brown dye is obtained from the bark[21, 46, 257]. A red dye is obtained from the inner bark according to another report[226]. A little rock dust has been added to act as a mordant when boiling the bark[257]. The boiled bark has been used to make a wash to clean rust off iron and steel, and to prevent further rusting[257]. Tolerant of light trimming, plants can be grown as a hedge[81]. This species does not make a good hedge in Britain[200]. Some cultivars can be grown as a ground cover when planted about 1 metre apart each way[208]. 'Pendula' is slow-growing but makes a very good cover[208]. Wood - coarse-grained, light, soft, not strong, brittle, not durable outdoors[21, 46, 61, 82, 171, 229]. Difficult to work because it splits easily[226]. The wood weighs 26lb per cubic foot[235]. The trees do not self-prune and so the wood contains numerous remarkably hard knots that can quickly dull the blade of an axe[226]. A coarse lumber, it is used occasionally for the outside of buildings[21, 46, 61, 82, 171, 229]. It should be used with caution as a fuel for outdoor fires because it can project embers and burning wood several metres from the fire[226].

dwatta Antidiarrhoeal Antipruritic Astringent Diaphoretic Diuretic Dysentery Eczema Skin StpyticCanadian hemlock was commonly employed medicinally by several native North American Indian tribes who used it to treat a variety of complaints[257]. It is still sometimes used in modern herbalism where it is valued for its astringent and antiseptic properties. The bark is rich in tannin and is astringent and antiseptic[222, 254]. A decoction is used in the treatment of diarrhoea, colitis, diverticulitis and cystitis[254]. Externally, it is used as a poultice to cleanse and tighten bleeding wounds, as a douche to treat excessive vaginal discharge, thrush and a prolapsed uterus, and as a mouthwash and gargle for gingivitis and sore throats[222, 254]. The poultice has also been applied to the armpits to treat itchinness there[257]. The inner bark is diaphoretic and styptic[21, 213, 257]. An infusion is used in the treatment of colds and abdominal pains[21, 213, 257]. A decoction of the inner bark has been applied externally in the treatment of eczema and other skin conditions[257]. The pulverized inner bark has been applied to cuts and wounds to stop the bleeding[257]. A tea made from the leafy twig tips is used in the treatment of dysentery, kidney ailments, colds and rheumatism[21, 222, 257]. Externally, it is used in steam baths for treating colds, rheumatism and to induce sweating[222]. A decoction of the branches has been boiled down to a syrup or thick paste and used as a poultice on arthritic joints[257]. A poultice of the crushed branch tips has been used to treat infections on an infants navel[257]. Hemlock pitch has been used externally as a counter-irritant in the treatment of rheumatism[213].

nrakta Eastern N. America - Nova Scotia to Georgia, west to Alberta and Minnesota. ksacta Woods and swampy areas on cool moist sites[21], also in upland forests, often covering the north side of ridges[82].

propta Seed - it germinates better if given a short cold stratification[80, 113] and so is best sown in a cold frame in autumn to late winter. It can also be sown in early spring, though it might not germinate until after the next winter. If there is sufficient seed, an outdoor sowing can be made in spring[78]. Pot-grown seedlings are best potted up into individual pots once they are large enough to handle - grow them

in a cold frame and plant them out in early summer of the following year. Trees transplant well when they are up to 80cm tall, but they are best put in their final positions when they are about 30 - 45 cm or less tall, this is usually when they are about 5 - 8 years old[200]. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200].

nwatta Landscape Uses:Firewood, Hedge, Aggressive surface roots possible, Massing, Screen, Specimen, Woodland garden. An easily grown plant, it thrives best when growing in a deep well-drained soil in the western parts of Britain where it appreciates the higher rainfall[111]. However, it succeeds in most soils and positions, being especially good on acidic sandy soils[81] but also tolerating some lime[11] so long as there is plenty of humus in the soil[208]. Plants are very shade tolerant when young, but need more sunlight as they grow older[81, 200]. Plants are thin and poor when grown in dry or exposed places[200]. A slow-growing but long-lived species in the wild, with specimens nearly 1000 years old recorded[229]. It is occasionally planted as a timber tree in Germany[50]. It is very slow growing in cultivation for the first few years, it then grows more rapidly with annual shoots up to 60cm long. This rate of growth soon slows as the tree loses apical dominance and it becomes slow growing again[185]. Seed production commences around the age of 20 - 40 years, with good crops produced every 3 - 4 years[229]. The crushed foliage has a sweet lemony scent[185]. Another report says that it emits the unpleasant smell of hemlock[245]. Many named forms have been selected for their ornamental value[185]. Almost all of them are dwarf forms[200]. Plants in this genus are notably resistant to honey fungus[200]. Special Features:Attracts birds, North American native, Inconspicuous flowers or blooms.

5.2.496 *Parthenocissus tricuspidata*

Boston Ivy, Japanese Ivy, Japanese Creeper 4 tin 8 cyuc 1 kcaak 0 tcan 0 dwat 18 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Parthenocissus tricuspidata* is a deciduous Climber growing to 18 m (59ft 1in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from July to August, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcaakta Edible Parts: SapEdible Uses: SweetenerSap - sweet[177]. The sap flows quite freely when it is harvested in the spring, as the plant comes into new growth, and can be used as a sugar substitute[105].

tcanta This species can be grown as a ground cover plant in a sunny position[188]. Plants should be spaced about 2.5 metres apart each way[208]. They are very vigorous, however, and would soon swamp smaller plants[K].

nrakta E. Asia - China, Japan, Korea. A garden escape in Britain. ksacta Thickets and woods in hills and mountains[58]. Climbing over rocks or shrubs on hillsides at elevations of 100 - 1200 metres in China[266].

propta Seed - best sown as soon as it is ripe in a cold frame[200]. Stored seed requires stratifying for 6 weeks at 5°c and should be sown as early in the year as possible[200]. Germination is variable. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm taken at a node (ensure that it has at least 2 true buds), July/August in a frame[78]. Easy to root but they do not always survive the first winter[182]. Basal hardwood cuttings of current seasons growth, 10 - 12 cm long, autumn in a frame[200]. Layering[200].

nwatta Landscape Uses:Arbor, Woodland garden. Requires a well-drained moisture retentive fertile soil[200]. Succeeds in any fertile soil in sun or part shade[202]. Dormant plants are hardy to about -15°c[200], though the young

growth in spring can be damaged by late frosts. A very ornamental plant[1], there are several named varieties[182]. The flowers are only produced on mature stems[202] and plants usually only fruit after a long hot summer[219]. A rampant climbing plant, clinging by means of round pad-like suckers on the tendrils[11]. It can become a bit of a nuisance by growing into gutters[182]. Plants are very tolerant of trimming and can be cut right back to within 1 metre of the base if required to rejuvenate the plant[202]. Any pruning is best carried out in the spring[219]. Dislikes transplanting[11], plants often put on very little growth in the year after planting out, though they are then fast growing[202]. Plants often hybridize and so do not always come true from seed[200]. Special Features: Not North American native, Invasive, Inconspicuous flowers or blooms.

5.2.497 *Tsuga caroliniana*

Carolina Hemlock

4 tlin 7 cyuc 1 kcaak 0 tcan 2 dwat 15 m hkuc
pcimhmhtut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflat-prikliwis hpa7tmwatli hjonli

drutta *Tsuga caroliniana* is an evergreen Tree growing to 15 m (49ft) by 8 m (26ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower in April, and the seeds ripen from October to November. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil. It can tolerate atmospheric pollution.

kcakta Edible Parts: Inner barkEdible Uses: TeaInner bark - raw or dried, ground into a powder and then used as a thickening in soups etc or mixed with cereals when making bread[2, 46, 161]. The leaves and twigs yield 'spruce oil', which is used commercially to flavour chewing gum, soft drinks, ice cream etc[183]. A herbal tea is made from the young shoot tips[2, 62, 95, 159, 183]. These tips are also an ingredient of 'spruce beer'[183].

tcanta Dye Hedge Hedge Resin Rust Tannin WoodThe inner bark has been used to make baskets[257]. A rosy-tan dye can be obtained from the bark[257]. The bark is a source of tannin[257]. All the uses listed below are based on the uses of *T. canadensis* and reports in [46, 61, 82] that this species has similar uses. Yields a resin similar to *Abies balsamea*, it is gathered by incisions in the trunk or by boiling the wood[46, 61, 64]. A pitch (called hemlock pitch), is obtained by distillation of the young branches[46]. 'Oil of Hemlock' is distilled from the young branches according to another report[82]. The boiled bark has been used to make a wash to clean rust off iron and steel, and to prevent further rusting[257]. Tolerant of light trimming, plants can be grown as a hedge[81]. This species does not make a good hedge in Britain[200]. Some cultivars can be grown as a ground cover when planted about 1 metre apart each way[208]. 'Pendula' is slow-growing but makes a very good cover[208]. Wood - coarse-grained, light, soft, not strong, brittle, not durable outdoors[21, 46, 61, 82, 171, 229]. Difficult to work because it splits easily[226]. The wood weighs 26lb per cubic foot[235]. The trees do not self-prune and so the wood contains numerous remarkably hard knots that can quickly dull the blade of an axe[226]. A coarse lumber, it is used occasionally for the outside of buildings[21, 46, 61, 82, 171, 229]. It should be used with caution as a fuel for outdoor fires because it can project embers and burning wood several metres from the fire[226].

dwatta Antipruritic Astringent Birthing aid Diaphoretic Diuretic KidneyThe bark is astringent, diaphoretic and diuretic[21]. A tea made from the inner bark or twigs is helpful in the treatment of kidney or bladder problems, and also makes a good enema for treating diarrhoea[21]. It can also be used as a gargle or mouthwash for mouth and throat problems or externally to treat sores and ulcers[21]. A poultice of the bark has been used to treat itchy armpits[257]. The powdered bark can be put into shoes for tender or sweaty feet or for foot odour[21]. An infusion of the stem tips has been used to treat kidney problems[257]. A decoction of the roots has

been used as a birthing aid to help expel the afterbirth[257]. The roots have been chewed in order to treat diarrhoea[257].

nrakta South-eastern N. America - W. Virginia to Georgia. ksacta Usually found growing singly or in small scattered groves of a few individuals on the rocky banks of streams at elevations of 750 - 1200 metres[82].

propta Seed - it germinates better if given a short cold stratification[80, 113] and so is best sown in a cold frame in autumn to late winter. It can also be sown in early spring, though it might not germinate until after the next winter. If there is sufficient seed, an outdoor sowing can be made in spring[78]. Pot-grown seedlings are best potted up into individual pots once they are large enough to handle - grow them on in a cold frame and plant them out in early summer of the following year. Trees transplant well when they are up to 80cm tall, but they are best put in their final positions when they are about 30 - 45 cm or less tall, this is usually when they are about 5 - 8 years old[200]. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200].

nwatta Landscape Uses:Hedge, Aggressive surface roots possible, Screen, Specimen. An easily grown plant, it thrives best when growing in a deep well-drained soil in the western parts of Britain where it appreciates the higher rainfall[11]. However, it succeeds in most soils and positions, being especially good on acidic sandy soils[81] but also tolerating some lime[11] so long as there is plenty of humus in the soil[208]. Plants are very shade tolerant when young, but need more sunlight as they grow older[81, 200]. Plants are thin and poor when grown in dry or exposed places[200]. This species is more tolerant of atmospheric pollution than *T. canadensis*[11]. A slow growing tree in Britain, it requires hot humid summers[200]. It is probably less slow in the far west and in Ireland[185]. Trees have not done well in this country even though they are very cold-tolerant[11]. Plants in this genus are notably resistant to honey fungus[200]. Special Features:Attracts birds, North American native, Inconspicuous flowers or blooms.

5.2.498 *Sorbus alnifolia*

Korean Mountain Ash

4 tlin 7 cyuc 1 kcaak 0 tcan 0 dwat 15 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Sorbus alnifolia* is a deciduous Tree growing to 15 m (49ft) by 8 m (26ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in May, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

pcista The seeds probably contain hydrogen cyanide. This is the ingredient that gives almonds their characteristic flavour. Unless the seed is very bitter it should be perfectly safe in reasonable quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[74, 105]. The fruit is about the size of a pea, up to 14mm long[266], and is produced in fairly large bunches making it easy to harvest[200]. The flavour is reasonably mild and somewhat mealy[K].

tcanta WoodWood - even grained. Used for rulers[74]. nrakta E. Asia - China, Japan, Korea. ksacta Slopes of shady mountain forests of stone pine and deciduous trees on stony and humus rich soils[74]. Slopes, gullies, mixed forests and shrubby thickets at elevations of 500 - 2400 metres[266].

propta Seed - best sown as soon as it is ripe in a cold frame[78, 80]. If you have sufficient seed it can be sown in an outdoor seedbed[78, 80]. Stored seed germinates better if given 2 weeks warm then 14 - 16 weeks cold stratification[98], so sow it as early in the year as possible. Prick out the seedlings into individual pots when they are large enough to handle. Seedlings are very slow to put on top-growth for

nwatta Landscape Uses:Border, Foundation, Massing, Specimen. Tolerates most soils[200], thriving in a well-drained loamy soil[1], but resenting dryness at the roots[11, 200]. Requires partial shade[11]. Does well on very acid soils with a pH around 4.5[200]. In frosty areas it is best to site the plant in a position shaded from the early morning sun[238]. A good bee plant[108]. The flowers are sweetly scented[245]. Plants are best left unpruned[49]. Another report says that the previous year's flowering shoots should be cut back in early spring[238]. This species is notably susceptible to honey fungus[200]. Special Features:North American native, Suitable for cut flowers, Suitable for dried flowers, Blooms are very showy.

5.2.529 *Cornus amomum*

Silky Dogwood

4 tlin 8 cyuc 1 kcaak 0 tcan 2 dwat 3 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyikrip hpa7tli flatprikli-wisslip hpa7tmwatli xre7t hjonli

drutta *Cornus amomum* is a deciduous Shrub growing to 3 m (9ft 10in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 161, 177]. Said to be very good to eat[2]. The fruit is 8mm in diameter[235].

tcanta TeethThe powdered bark is used as a toothpowder[61].

dwatta Antiperiodic Astringent Diuretic Poulitce Stimulant Stomachic VDTThe dried root-bark is antiperiodic, astringent, stimulant (mild), tonic[4]. The flowers are said to have similar properties[4]. A tea or tincture of the astringent root bark has been used as a quinine substitute and also in the treatment of chronic diarrhoea[4]. It has also been employed in the treatment of painful urination, chest congestion etc[257]. The bark was also used as a poultice on external ulcers and as a wash for gonorrhoea sores[4, 257]. The glycoside 'cornin' found in the bark has astringent properties[4]. The fruits are used as a bitter digestive tonic. A tincture of them has been used to restore tone to the stomach in cases of alcoholism[4].

nrakta Eastern N. America - Newfoundland to Ontario, south to Florida and Texas. ksacta Swamps and damp thickets[43]. Low woods and along the sides of streams[235].

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

nwatta Landscape Uses:Border, Massing, Specimen, Woodland garden. An easily grown plant that thrives in Britain, it succeeds in any soil of good or moderate fertility[1], ranging from acid to shallow chalk[200]. Grows well in heavy clay soils. Succeeds in full sun or light shade[188]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: Attracts birds, Attractive foliage, Not North American native, Naturalizing, Wetlands plant, Attracts butterflies, Attractive flowers or blooms.

5.2.530 *Calystegia subvolubilis*

4 tlin 8 cyuc 1 kcaak 0 tcan 0 dwat 3 m hkuc
htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Calystegia subvolubilis* is a PERENNIAL CLIMBER growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista Although no reports of toxicity have been seen for this species, at least some, if not all members of this genus are purgative[173], some caution is advised.

kcakta Edible Parts: Leaves RootEdible Uses: Root - cooked[105]. Some caution is advised, see the notes above on toxicity. Young shoots - cooked[105]. Some caution is advised, see the notes above on toxicity.

nrakta E. Asia - Japan. ksacta A hybrid. C. pellita x C. sepium, it is not known in a truly wild situation.

propta Seed - sow spring in a cold frame in a free draining compost and only just cover. The seed usually germinates in 1 - 3 months at 15°C[138]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in early spring whilst dormant[200].

nwatta Easily grown in ordinary garden soil in a sunny position, but plants are apt to become invasive[1, 200]. Nearly all taxa in *Calystegia* intergrade geographically into neighboring taxa with the exception of the widespread coastal species, *C. soldanella* (Linnaeus) R. Brown. It is impossible to draw clearly defined specific limits, and intermediate forms are always found where two taxa approximate geographically[266].

5.2.531 *Calystegia pubescens*

Japanese Bindweed

4 tlin 8 cyuc 1 kcaak 0 tcan 1 dwat 3 m hkuc
htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Calystegia pubescens* is a PERENNIAL CLIMBER growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista This species is said to be purgative[173], some caution is advised.

kcakta Edible Parts: Leaves RootEdible Uses: Root - cooked[105, 177, 179]. Said to be purgative[179]. Young shoots - cooked[105, 177, 179].

dwatta Demulcent Diuretic Poulitce TonicThe flowers are diuretic, they are helpful in cases of diabetes[218]. The plant is demulcent, diuretic and tonic[218]. It is also used as a tonic to correct broken bones and tendons[218].

nrakta E. Asia - China, Japan, Korea. ksacta Sunny grassy places and thickets in lowland all over Japan[58].

propta Seed - sow spring in a cold frame in a free draining compost and only just cover. The seed usually germinates in 1 - 3 months at 15°C[138]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in early spring whilst dormant[200].

nwatta Easily grown in ordinary garden soil in a sunny position, but plants are apt to become invasive[1, 200]. Nearly all taxa in *Calystegia* intergrade geographically into neighboring taxa with the exception of the widespread coastal species, *C. soldanella* (Linnaeus) R. Brown. It is impossible to draw clearly defined specific limits, and interme-

nwatta Requires a moist well-drained fertile soil[17]. A climbing plant, the weak stems support themselves by twining around other plants and are capable of growing quite high up into shrubs and trees[4]. Dioecious. Male and female plants must be grown if seed is required.

5.2.526 *Holodiscus discolor*

Creambush, Oceanspray

4 tin 8 cyuc 1 kcaak 0 tcan 2 dwat 3 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliw
hpa7tmwatli xre7t hjonli

drutta *Holodiscus discolor* is a deciduous Shrub growing to 3 m (9ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in July, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[106, 177, 183]. Small and dry[161, 183].
tcanta WoodWood - very hard. Used for making small tools, roasting tongs etc[118]. It does not burn easily[118].

dwatta Blood purifier Ophthalmic Poultice Skin Tonic-The seeds are a blood purifier[257]. An infusion has been used in the treatment of smallpox, black measles and chick-enpox[257]. The blossoms have been used in the treatment of diarrhoea[257]. The inner bark is tonic[257]. An infusion has been used as an eyewash[257]. The bark can be dried, powdered and then used with oil as a dressing on burns[257]. A poultice of the leaves has been applied to sore lips and sore feet[257]. A powder of the dried leaves has been used as a dressing on sores[257]. A decoction of the leaves has been used in the treatment of influenza[257].

nrakta Western N. America. ksacta Woods and rocky places in California[71]. Streambanks and moist woods, canyons and hills from valleys to around 2,100 metres[212].

propta The seed requires 4 months stratification at 4°C. It is best sown as soon as it is ripe in a cold frame. Stored seed should be sown as early in the year as possible. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood with a heel, July/August in a frame. Can be difficult[200]. Layering in spring. Easy[200].

nwatta Succeeds in a good loamy soil that does not become too dry in summer, in full sun or light shade[200]. A fast-growing plant[188], it thrives in thin woodland[11]. A very ornamental plant[1, 11], when fully dormant it is hardy to about -15°C[200], though the young growth in spring can be damaged by late frosts[K]. The flowers emit a perfume similar to meadowsweet[245].

5.2.527 *Rhamnus japonica*

Japanese buckthorn

4 tin 8 cyuc 1 kcaak 0 tcan 1 dwat 3 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliw
hpa7tmwatli xre7t hjonli

drutta *Rhamnus japonica* is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention of toxicity has been found for this species, there is the suggestion that some members of this genus could be mildly poisonous[65].

kcakta Edible Parts: LeavesEdible Uses: Leaves[105, 177]. No more details but some caution is advised, see the notes above on toxicity.

tcanta Dye WoodA green dye is obtained from the branches[178]. Wood - close grained. Used for furniture[46, 61].

dwatta Emetic Febrifuge Laxative SkinFebrifuge, laxative, skin[46, 61, 178]. The fruit and the bark are emetic and laxative[218].

nrakta E. Asia - Japan. ksacta Found all over Japan[58].
propta Seed - best sown in the autumn in a cold frame. Stored seed will require 1 - 2 months cold stratification at about 5° and should be sown as early in the year as possible in a cold frame or outdoor seedbed[200]. Prick out the seedlings into individual pots when they are large enough to handle, and grow them on in the greenhouse or cold frame for their first winter. Plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame[113]. Cuttings of mature wood of the current year's growth, autumn in a frame. Layering in early spring[4].

nwatta Succeeds in any reasonably good soil[11]. A polymorphic species[58]. The species in this genus are notably resistant to honey fungus[200].

5.2.528 *Hydrangea arborescens*

Seven Barks, Wild hydrangea, Ashy Hydrangea, Snowhill Hydrangea, Smooth Hydrangea

4 tin 9 cyuc 1 kcaak 0 tcan 3 dwat 3 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatprikliw
hpa7tmwatli xre7t hjonli

drutta *Hydrangea arborescens* is a deciduous Shrub growing to 3 m (9ft) by 2 m (6ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Dizziness, chest pain, gastrointestinal distress. Weak potential for sensitization [301].

kcakta Edible Parts: StemEdible Uses: The peeled branches and twigs have been used to make a tea[257]. The new growth of young twigs has been peeled, boiled thoroughly then fried and eaten[257].

dwatta Anthelmintic Cathartic Diaphoretic Diuretic Sialagogue TonicSeven barks was used by the North American Indians as a remedy for kidney and bladder stones and is still used for these purposes in modern herbalism[254]. It is considered to both encourage the expulsion of stones and to help dissolve those that remain[254]. The roots are anthelmintic, cathartic, diaphoretic, diuretic, emetic and tonic[4, 21, 46, 165, 222, 238]. They are used in the treatment of kidney stones, mucous irritations of the bladder, cystitis, nephritis, enlarged prostate and bronchial affections[222, 238, 254]. Excessive doses can cause dizziness and bronchial congestion[238]. The fresh roots are very succulent and can be easily cut, when dry they become very tough and resistant[4]. They are harvested in the autumn and it is best to cut them into short sections before drying them[4, 254]. The scraped bark is used as a poultice on wounds, burns, sore muscles, sprains etc[222]. The bark is chewed in the treatment of stomach and heart ailments[222]. The leaves are cathartic, diuretic, sialagogue and tonic[4].

nrakta Eastern N. America - New York to Florida, west to Ohio, Oklahoma and Indiana. ksacta Rich woods, banks of streams and calcareous rocky slopes[43].

propta Seed - surface sow in a greenhouse in spring[113]. Cover the pot with paper until the seed germinates[78]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 8cm long, July/August in a frame. Overwinter in a greenhouse and plant out in late spring[78]. Thick growths make the best cuttings, but these should be placed in individual pots[78]. Good percentage[113]. Cuttings of mature wood in late autumn in a frame[200]. Mound layering in spring. Takes 12 months[78]. Division of suckers in late winter[113]. They can be planted out direct into their permanent positions. Leaf-bud cuttings of the current seasons growth in a frame[200].

their first year or two[11], but they are busy building up a good root system. It is best to keep them in pots in a cold frame for their first winter and then plant them out into their permanent positions in late spring.

nwatta Landscape Uses:Specimen. Succeeds in most reasonably good soils in an open sunny position[11]. Dislikes dry soils[188]. Tolerates light shade[188], though it fruits better in a sunny position[K]. Plants are susceptible to fire-blight[188]. Special Features:Not North American native, Attractive flowers or blooms.

5.2.499 *Maclura pomifera*

Osage Orange, Bois D'Arc

4 tin 9 cyuc 1 kcaak 0 tcan 2 dwat 15 m hkuc
htut cyutli kyuctup hwicli hyishrasjlutnyik hpa7tli flatprikliw
hpa7tmwatli nyanhjen hjonli

drutta *Maclura pomifera* is a deciduous Tree growing to 15 m (49ft) by 12 m (39ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to June, and the seeds ripen from September to December. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). . . The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

pcista The milky sap can cause dermatitis in some people[200]. An extract and the juice of the fruit is toxic, though a 10% aqueous infusion and extract diluted 1:1 are not toxic[240].

kcakta One report suggests that the fruit is edible[74] but this is surely a mistake - although very large, the fruit is harsh, hard, dry and astringent. The fruit does, however, contain an anti-oxidant which can be used as a food preservative, especially for oils[61]. The heartwood and the root yield a non-toxic antibiotic that is useful as a food preservative[240].

tcanta Dye Fodder Fuel Hedge Preservative Repellent Shelterbelt Tannin WoodA yellow dye is obtained from the bark of the root and the wood[46, 57, 95, 149, 169, 257]. Green and orange can also be obtained from it[168]. The sap of the fruit is used as an insect repellent[95]. It is said to be effective against cockroaches[222]. The bark is a source of tannin[82, 149]. The plant is often grown as a hedge in N. America and Europe[1, 20, 50], it is very tolerant of severe pruning[200], makes an effective stock-proof barrier[200] and succeeds in maritime exposure[K]. A hedge in a very exposed position at Rosewarne in N. Cornwall has grown well (1989), though it is very bare in winter[K]. This species is also used in shelterbelt plantings[200]. Wood - coarse-grained, exceedingly hard, heavy, flexible, very strong, very durable, silky, lustrous. It weighs 48lb per cubic foot. One of the most durable woods in N. America, it is seldom used commercially, but is used locally for fence posts,piers, bows etc and makes an excellent fuel[46, 82, 95, 171, 200, 227, 229, 274].

dwatta Cardiac OphthalmicA tea made from the roots has been used as a wash for sore eyes[222, 257]. The inedible fruits contain antioxidant and fungicidal compounds[222]. A 10% aqueous infusion and an extract diluted 1:1 have cardiovascular potentialities[240].

nrakta Southeastern N. America - Arkansas to Texas. ksacta Woods, fields and thickets in rich bottom lands[73, 83].

propta Seed - best sown as soon as it is ripe in pots in a cold frame. Pre-soak stored seed for 48 hours in warm water and stratify for 2 months at 4°C then sow in a cold frame[113, 200]. Germination is normally good. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. The seed stores for 3 years[113]. If growing larger quantities of plants, it is probably best to sow the seed in an open seed bed[200]. Grow the plants on for a couple of years in the seed bed before planting them out into their permanent positions. Cuttings of half-ripe wood, July/August in a frame[200]. Cuttings of mature wood, November to January in a frame[113].

Layering in summer[200]. Root cuttings 4cm long in December. Plant horizontally in pots in a greenhouse and plant out as soon as possible. Good percentage[78].

nwatta Agroforestry Services: Living fence Fodder: Insect Industrial Crop: Biomass Industrial Crop: Dye Industrial Crop: Starch Management: Coppice Management: Standard Regional Crop Staple Crop: Protein-oilLandscape Uses:Firewood, Pest tolerant, Aggressive surface roots possible. Prefers a well-drained soil in full sun[200]. Succeeds in poor soils and also in dry ones[20]. Plants are fairly tolerant of maritime exposure[K]. They dislike waterlogged soils[188]. Dormant mature plants are hardy to about -20°C though the young growth in spring can be cut back by late frosts[200] and young plants can be damaged in cold winters[188]. Plants require hot summers to fully ripen their wood if they are to thrive in areas with cold winters[188]. Plants are tolerant of severe pruning[200]. This species is notably resistant to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required. Special Features:North American native, All or parts of this plant are poisonous, Inconspicuous flowers or blooms.

5.2.500 *Clematis vitalba*

Traveller's Joy, Evergreen clematis

4 tin 8 cyuc 1 kcaak 1 tcan 2 dwat 15 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliw
wisslip hpa7tmwatli xre7t hjonli

drutta *Clematis vitalba* is a deciduous Climber growing to 15 m (49ft) by 15 m (49ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from July to September, and the seeds ripen from October to January. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All parts of the plant are poisonous[7], the toxic principle is dissipated by heat or by drying[65].

kcakta Edible Parts: LeavesEdible Uses: Young shoots - cooked and used like hop shoots (Humulus lupulus)[7, 46, 61]. Caution is advised due to reports of toxicity[7].

tcanta BasketryThe stems are used in basketry[100, 115].

dwatta Analgesic Bach Diuretic Homeopathy Rubefacient SkinThe leaves are analgesic, diuretic and rubefacient[7, 61]. The boiled roots and stems are used as a cure for the itch[4]. When applied in the nostrils, the plant juice has been used to relieve migraine attacks, but it can also destroy the mucous membranes[7]. The plant should not be taken internally because it is poisonous[7]. A homeopathic remedy is made from the plant. It is used in the treatment of rheumatism and skin eruptions[238]. The plant is used in Bach flower remedies - the keywords for prescribing it are 'Indifference', 'Dreaminess', 'Inattention' and 'Unconsciousness'[209]. It is also one of the five ingredients in the 'Rescue remedy'[209].

nrakta Europe, including Britain, from the Netherlands south and east to N. Africa and the Caucasus. ksacta Hedgerows and wood margins, usually on calcareous soils[7, 17].

propta Seed - best sown as soon as it is ripe in a cold frame[164, 200]. Sow stored seed as soon as it is obtained in a cold frame. Pre-soak the seed for 12 hours in warm water and remove as much of the tail and outer coat as possible[164]. A period of cold stratification is beneficial[164]. The seed germinates in 1 - 9 months or more at 20°C[164]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant out in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, taken between nodes, July/August in a frame[1]. Internodal cuttings of soft to semi-ripe wood, late spring in sandy soil in a frame. Layering of old stems in late winter or early spring[200]. Layering of current seasons growth in early summer[200].

nwatta Prefers a deep moist soil with its roots in the shade[11, 200]. Dislikes poorly-drained heavy clay soils, but

grows well in clay if grit is added for drainage[11, 200]. Dislikes light sandy soils[11]. Does well on chalk[1]. Dislikes acid soils below a pH of 6.0[186]. Succeeds in acid as well as alkaline soils[200]. Plants are hardy to about -18°c[202]. A twining plant[182]. The leafstalks wrap themselves around twigs and branches for support. When a side of the stalk touches an object, the growth on that side slows down whilst the other side grows at its normal rate - this causes the leaf stalk to entwine the object it is touching[186, 212]. It is capable of growing 2 metres in a year and can easily smother small trees and shrubs[186]. Another report says that it can grow 5 metres in a year[202]. When planting out, in order to avoid the disease 'clematis wilt', it is best to plant the root-ball about 8cm deeper in the soil. This will also serve to build up a good root crown of growth buds[200]. The flowers are almond-scented[202]. They are produced on the current season's growth[219]. The plant is very amenable to pruning and can be cut back severely if required. This is best done in early spring[202]. A greedy plant, inhibiting growth of nearby plants, especially legumes[54]. Plants seem to be immune to the predations of rabbits[233]. This species is notably resistant to honey fungus[88, 200].

5.2.501 Magnolia kobus

Kobus magnolia, Northern Japanese Magnolia

4 tin 7 cyuc 1 kcaak 0 tcan 1 dwat 12 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Magnolia kobus is a deciduous Tree growing to 12 m (39ft) by 7 m (23ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Beetles. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. It can tolerate atmospheric pollution.

kcakta Edible Parts: Flowers LeavesEdible Uses: Conditment TeaFlowers and flower buds - cooked[177, 183]. The leaves are eaten or used to make a tea[183]. Older leaves are powdered and sprinkled on foods as a flavouring[183].

tcanta WoodWood - soft, light. Used for engraving, utensils, matches etc[46, 61].

dwatta Treats headaches[174].

nrakta E. Asia - Japan. ksacta Hills and bases of mountains all over Japan[58].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed must be kept cold over the winter and should be sown in late winter in a cold frame[200]. The seed usually germinates in the spring but it can take 18 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for at least their first winter. They can be planted out into their permanent positions when they are more than 15cm tall, though should be well mulched and given some protection from winter cold for their first winter or two outdoors. Layering in early spring[200]. Cuttings of half-ripe wood in early summer[202].

nwatta Landscape Uses:Firewood, Pest tolerant, Specimen. Best grown in a warm position in a moderately rich free soil of an open texture[1]. Succeeds in acid or neutral soils in sun or part shade[184]. Fairly lime tolerant[200, 202]. The branches are brittle so a sheltered position is required[200]. Very tolerant of atmospheric pollution[200]. A very hardy plant, tolerating temperatures down to about -28°c[200]. The fleshy roots are easily damaged and any transplanting is best done during a spell of mild moist weather in late spring[182]. Plants take 10 - 15 years to flower after being planted out[202]. The leaves are slightly aromatic[188]. Very closely related to *M. stellata*, differing in having 3 narrow sepals and 6 - 9 broader petals. Special Features:Not North American native, Fragrant flowers, Attractive flowers or blooms.

5.2.502 Eucommia ulmoides

Gutta-Percha

4 tin 8 cyuc 1 kcaak 0 tcan 3 dwat 12 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli nyanhjen hjonli

drutta Eucommia ulmoides is a deciduous Tree growing to 12 m (39ft) by 8 m (26ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in April, and the seeds ripen from September to October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young leaves[178]. No further details are given.

tcanta Latex WoodA rubber is obtained from the sap, but not in commercially viable quantities[11, 46, 61]. The leaves contain 3% dry weight of gutta-percha, a non-elastic rubber, used for insulation of electrical wires etc[74]. The gutta-percha is found in all parts of the tree and is extracted by alcohol[61, 174]. The wood is used for making Pattens (a type of shoe with raised soles)[178].

dwatta Analgesic Anticholesterolemic Aphrodisiac Astringent Depurative Diuretic Hepatic Hypotensive Sedative Tonic VasodilatorGutta-percha, known as Du Zhong in China, is commonly used in Chinese herbalism, where it is considered to be one of the 50 fundamental herbs[218]. It is considered to be an excellent tonic for the kidneys and liver, and is thought to act specifically on the lower part of the body[254]. Much interest has been aroused by Du Zhong's ability to reduce high blood pressure. In a clinical trial involving 119 people, 46% of those treated with the herb showed a significant reduction in blood pressure[254]. However, it seems to have little effect in cases of severe hypertension[254]. The stem bark is analgesic, anticholesterolemic, aphrodisiac, depurative, diuretic, hepatic, hypotensive, sedative, tonic and vasodilator[11, 46, 147, 176, 178, 218, 279]. Its use lowers blood pressure (the stir-fried bark is stronger than raw and a decoction is stronger than a tincture) and reduces the absorption of cholesterol[176]. It is used in the treatment of impotence, frequent urination, lumbago, weakness of the lower part of the body, aching back and knees, hypertension and threatened abortion[176, 254]. The flowers and the fruit are astringent[218].

nrakta E. Asia - China. ksacta Mountainous regions[74]. Lower mountains, valleys or sparsely forests at elevations of 300 - 500 metres in Gansu, Guizhou, Henan, Hubei, Hunan, Shaanxi, Sichuan, Yunnan and Zhejiang provinces[266].

propta Seed - best sown as soon as it is ripe in a cold frame. Stratify stored seed for 3 months at 2°c[113]. Germination is usually good and takes place in the first spring[K]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame[11].

nwatta Industrial Crop: Hydrocarbon Management: CoppiceSucceeds in any well-drained moisture retentive soil in full sun with shelter from cold winds[200]. Prefers a good loamy soil[11]. A fast growing[1] and very cold-tolerant tree, withstanding temperatures down to about -20°c[74]. Trees are commonly cultivated in Russia and China, both for gutta percha and for the medicinal use of the stembark[11, 218]. By using different solvents it is possible to obtain both of these products and the residue is then used for energy production[218]. This species is the only hardy rubber tree that can be grown outdoors in Britain[11]. Dioecious. Male and female plants must be grown if seed is required.

5.2.503 Idesia polycarpa

Idesia

4 tin 8 cyuc 1 kcaak 0 tcan 0 dwat 12 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli nyanhjen hjonli

drutta Idesia polycarpa is a deciduous Tree growing to 12 m (39ft) by 10 m (32ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to July. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown

kcakta Edible Parts: FruitEdible Uses: TeaFruit - raw or cooked[105, 177]. Small and dry[161]. The leaves can be steeped in water to make a tea[257].

dwatta Antiseptic Astringent StomachicA decoction of the root has been used in the treatment of diarrhoea and stomach disorders[257]. A decoction of the stems has been used in the treatment of colds and stomach disorders[257]. A decoction of the flowers, leaves and stems has been used as an antiseptic wash[257].

nrakta Western N. America - Wyoming to Texas, Arizona and New Mexico. ksacta Dry rocky desert valleys and hillsides well up into the mountains[60].

propta The seed requires 4 months stratification at 4°c. It is best sown as soon as it is ripe in a cold frame. Stored seed should be sown as early in the year as possible. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood with a heel, July/August in a frame. Can be difficult[200]. Layering in spring. Easy[200].

nwatta Succeeds in a good loamy soil that does not become too dry in summer[1] in full sun or light shade[200]. Plants are hardy to about -15c[200].

5.2.524 Tamarix gallica

Manna Plant, French tamarisk

4 tin 8 cyuc 1 kcaak 0 tcan 2 dwat 4 m hkuc

htut cyutli kyuctup hwicli hrasjlutnyikfrip hpa7tli flatprikli-wissliphsum hpa7tmwatli xre7t hjonli

drutta Tamarix gallica is a deciduous Shrub growing to 4 m (13ft) by 6 m (19ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline and saline soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: MannaEdible Uses: A manna is produced by the plants in response to insect damage to the stems[2, 105]. It is sweet and mucilaginous[105]. There is some confusion over whether the manna is produced by the plant, or whether it is an exudation from the insects[4]. The insects in question live in the deserts around Israel, it is not known if the manna can be produced in Britain[K].

tcanta Dye Fuel Hedge Hedge Soil stabilization Tannin WoodVery tolerant of maritime exposure, it makes a good shelter hedge in coastal gardens[7, 11, 49, 75]. It dislikes being trimmed[75]. The plant has a rather open habit, however, and so is not tremendously effective at reducing wind speeds[K]. The extensive root system of this plant makes it suitable for use in erosion control in sandy soils[149]. The plant contains a high level of tannin[7]. Galls produced on the plant as a result of insect damage contain up to 40% tannin[240]. The tannin can be used as a dyestuff for fabrics[7]. (No details are given about the colour, though it is likely to be some shade of brown.) Wood - fairly hard, not strong, close grained, takes a high polish, it is often twisted or knotty[61, 149, 227]. Used for general construction, poles, turnery[61, 149]. It makes a good fuel, burning well even when green due to the wax content of the wood[74].

dwatta Astringent Detergent Diuretic Dysentery Expecto-rant LaxativeThe branchlets and the leaves are astringent and diuretic[7]. An external compress is applied to wounds to stop the bleeding[7]. The manna produced on the plant is detergent, expectorant and laxative[240]. Galls produced on the plant as a result of insect damage are astringent[240]. They are used in the treatment of diarrhoea and dysentery[240].

nrakta W. Europe - France. Naturalized in Britain[17]. ksacta Damp ground near the coast[17, 100].

propta Seed - sow in a cold frame and only just cover the seed. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the

last expected frosts. Cuttings of half-ripe wood, July/August in a frame. Very easy[200]. Cuttings of mature wood of the current seasons growth, 15 - 25cm long, planted outdoors in late autumn in a nursery bed or straight into their permanent position. High percentage[11, 200].

nwatta An easily grown plant, succeeding in most soils and tolerant of saline conditions[11]. Grows well in heavy clay soils as well as in sands and even shingle[182]. Usually found near the coast, it succeeds inland if given a fairly good deep loam and a sunny position[11, 200]. Tolerant of maritime winds and dry soils when grown near the coast[11], plants require a moister soil and shelter from cold drying winds when they are grown inland in non-saline soils because they use the soil salts that are found in saline soils to help them reduce transpiration[200]. This species flowers on the current year's growth[227]. Any pruning is best carried out in spring, hedges are also best trimmed at this time[188]. Plants are tolerant of severe pruning, sprouting freely from old wood[K]. The very closely related *T. anglica* is often included in this species. A good bee plant[74]. This species is notably resistant to honey fungus[88, 200].

5.2.525 Tamus communis

Black Bryony

4 tin 8 cyuc 1 kcaak 0 tcan 2 dwat 3.5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikli-wis hpa7tmwatli nyanhjen hjonli

drutta Tamus communis is a PERENNIAL CLIMBER growing to 3.5 m (11ft 6in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to July, and the seeds ripen from September to November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees, flies. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

pcista The whole plant is poisonous due to its saponin content[7]. Although toxic, saponins are very poorly absorbed by the body and so tend to pass through without causing harm. They are also broken down by thorough cooking. Saponins are found in many plants, including several that are often used for food, such as certain beans. It is advisable not to eat large quantities of food that contain saponins. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K]. The toxic effect of this plant is not caused by saponins, but by calcium oxalate crystals which are found mainly in the fruit[65].

kcakta Edible Parts: LeavesEdible Uses: Young shoots - cooked[2, 4, 61, 65]. A decidedly bitter flavour[7]. An asparagus substitute, it is best if the water is changed once whilst cooking[115]. See notes at top of the page regarding possible toxicity.

dwatta Antieccymotic Antirheumatic Cathartic Diuretic Emetic Haemolytic Poulitice RubefacientThe root is antieccymotic, diuretic, emetic, haemolytic and rubefacient[4, 7, 9]. Use with caution, the plant is rich in saponins, has a very powerful cathartic affect and ranks as a dangerous irritant poison[4, 7]. It is not normally used internally, but the macerated root is applied externally as a poultice to bruises, rheumatic joints etc[4, 7]. This should not be done without expert advice since it can cause painful blisters[9]. The root is used fresh[9] or can be harvested in the autumn and dried for later use[7].

nrakta Europe, south and east from Britain and Belgium to N. Africa, Hungary, E. Mediterranean, W. Asia. ksacta Hedgerows, scrub, woodland edges and copses, avoiding acid soils[1, 9].

propta Seed - sow in a cold frame in early spring or as soon as the seed is ripe in the autumn. Prick out the seedlings into individual pots once they are large enough to handle, and plant out in the summer or in late spring of the following year.

5.2.521 *Lonicera periclymenum*

Honeysuckle, European honeysuckle
4 tin 8 cyuc 1 kcaak 3 tcan 2 dwat 4.5 m hkuc
pcimhmimhtut cyutli hgattcup hwicli hrasjlutnyik hpa7tli frusflatprikhwisslip hpa7tmwatli fyfxfre7t hjonli

drutta *Lonicera periclymenum* is a deciduous Climber growing to 4.5 m (14ft 9in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from June to August, and the seeds ripen from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought.

pcista Poisonous in large doses[10]. It only has a very mild action[65].

kcaakta Edible Parts: Flowers NectarEdible Uses: Children (of all ages) suck the base of the flowers to extract the nectar[66].

tcanta A climbing plant, it can be allowed to scramble on the ground where it makes a good ground cover[208]. Plants should be spaced about 1.2 metres apart each way[208]. A very good moth and butterfly plant[30], it is also an important food for many caterpillars including the larvae of the rare white admiral butterfly[186]. The dense growth of the plant offers good nesting possibilities for birds[186].

dwatta Antispasmodic Astringent Cathartic Depurative Diaphoretic Diuretic Emetic Expectorant Febrifuge Laxative Mouthwash Skin VulneraryThe plant has expectorant and laxative properties[4]. A syrup made from the flowers has been used in the treatment of respiratory diseases whilst a decoction of the leaves is considered beneficial in treating diseases of the liver and spleen[4]. It is used as a mouth-wash for ulcers[66] and is considered to be a good ingredient in gargles[4]. The flowers are antispasmodic, astringent, diuretic, expectorant, febrifuge and sudorific[240]. The fruit is emetic and cathartic[4]. The herbage is used as a cutaneous and mucous tonic and as a vulnerary[4]. It is also diaphoretic[4]. The leaves are laxative and slightly astringent[240]. The seed is diuretic[4]. The bark is anticatarrhal, depurative, diuretic and sudorific[240].

nrakta Europe, including Britain, from Scandinavia south and east to N. Africa and Greece. ksacta Woods, hedgerows, scrub and shady places, avoiding calcareous soils[17].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed requires 2 months cold stratification[113] and should be sown as soon as possible in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm with or without a heel, July/August in a frame. Good percentage[78]. Cuttings of mature wood of the current season's growth, 15 - 20cm with or without a heel, November in a cold frame. Good percentage[78]. Layering in autumn[200].

nwatta Succeeds in most soils from acid to base-rich[186]. Prefers its roots in the shade with its shoots climbing up into the sun[200]. Plants succeed even in quite deep shade[219]. Established plants are fairly drought tolerant[190]. Plants are hardy to about -20°C[184]. A very ornamental plant[1], there are a number of named varieties[184]. The flowers are very fragrant, especially in the evening when it attracts pollinating moths[186, 245]. New leaves often start to open in January with well-grown leaves in April[186]. The leaves fall in November[186]. Twinning plants, they can bind themselves so tightly round young trees that they can prevent the trunk from being able to expand[186]. A very good moth and butterfly plant[30], it is also an important food for many caterpillars including the larvae of the rare white admiral butterfly[186]. The dense growth of the plant offers good nesting possibilities for birds[186]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, di-

viding from the crown into several primary roots going down and out [2-1].

5.2.522 *Clematis ianthina*

4 tin 8 cyuc 1 kcaak 0 tcan 0 dwat 4 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikhwisslip hpa7tmwatli xre7t hjonli

drutta *Clematis ianthina* is a deciduous Climber growing to 4 m (13ft 1in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no reports of toxicity have been seen for this species, some if not all members of this genus are mildly poisonous. The toxic principle is dissipated by heat or by drying[65].

kcaakta Edible Parts: LeavesEdible Uses: Leaves - cooked[177]. Some caution is advised, see the notes above on toxicity.

nrakta E. Asia - Northern China, eastern Siberia and Korea. ksacta Shrubberies and other bushy places[273].

propta Seed - best sown as soon as it is ripe in a cold frame[164, 200]. Sow stored seed as soon as it is obtained in a cold frame. Pre-soak the seed for 12 hours in warm water and remove as much of the tail and outer coat as possible[164]. A period of cold stratification is beneficial[164]. The seed germinates in 1 - 9 months or more at 20°C[164]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant out in late spring or early summer, after the last expected frosts. Internodal cuttings of soft to semi-ripe wood, late spring in sandy soil in a frame[200]. Layering of old stems in late winter or early spring[200]. Layering of current seasons growth in early summer[200].

nwatta Prefers a deep moist soil with its roots in the shade[1, 200]. Dislikes poorly-drained heavy clay soils, but grows well in clay if grit is added for drainage[1, 200]. Dislikes light sandy soils[11]. Does well on chalk[1]. Succeeds in acid as well as alkaline soils[200]. Very closely related to *C. fusca*, differing mainly in its short-stalked flowers with small bracts and the more violet coloured flowers[273]. A twining plant[182]. The leafstalks wrap themselves around twigs and branches for support. When a side of the stalk touches an object, the growth on that side slows down whilst the other side grows at its normal rate - this causes the leaf stalk to entwine the object it is touching[212]. Plants flower on the current season's new shoots. They can usually be left unpruned, though weak or dead shoots can be removed and main shoots can be cut back by up to two thirds of their length if they are outgrowing their allotted area[273]. When planting out, in order to avoid the disease 'clematis wilt', it is best to plant the rootball about 8cm deeper in the soil. This will also serve to build up a good root crown of growth buds[200]. Plants in this genus are notably resistant to honey fungus[200]. Plants seem to be immune to the predations of rabbits[233]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

5.2.523 *Holodiscus dumosus*

Rock Spiraea

4 tin 8 cyuc 1 kcaak 0 tcan 1 dwat 4.5 m hkuc
hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatprikhwisslip hpa7tmwatli xre7t hjonli

drutta *Holodiscus dumosus* is a deciduous Shrub growing to 4.5 m (14ft 9in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in July, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

if seed is required). and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcaakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177]. The fruit is a many seeded berry with a pulpy flesh[2], it is about 10mm in diameter[200].

nrakta E. Asia - China, Japan. ksacta Hills and mountain forests above elevations of 2000 metres[58, 109].

propta Seed - sow spring in a greenhouse[78]. Germination is usually very good[78]. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse or cold frame for their first two winters. Plant them out into their permanent positions in late spring, after the last expected frosts and consider giving them some protection from the cold for their first winter or two outdoors[K]. Plants cannot be sexed until they flower[78]. Cuttings of half-ripe wood with a heel, July/August in a frame. Fair percentage[78]. Layering in spring. Takes 12 months[78].

nwatta Prefers a neutral to slightly acid loamy soil, but tolerates a chalky sub-soil if the top soil is deep[200]. Succeeds in full sun or semi-shade[188]. The dormant plant is hardy to about -15°C, though the tree is somewhat harder if the wood is thoroughly ripened by a long hot summer[200]. The young shoots in spring can be damaged by late frosts. A very ornamental plant[1]. The flowers have a most delicious perfume, which can be wafted far and wide by warm breezes[245]. Trees produce fruit regularly at Kew[11]. Dioecious. Male and female plants must be grown if fruit and seed is required. Female plants can produce some fruit in the absence of a male plant[11].

5.2.504 *Salix caprea*

Goat Willow, Kilmarnock Willow, Pink Pussy Willow, Pussy Willow

4 tin 9 cyuc 1 kcaak 4 tcan 2 dwat 10 m hkuc
hmimhtut cyutli kyuctcupjha7n hwicli hrasjlutnyikfrip hpa7tli flatprikhwisslip hpa7tmwatli nyanhjen hjonli

drutta *Salix caprea* is a deciduous Tree growing to 10 m (32ft) by 8 m (26ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from March to April, and the seeds ripen in May. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry moist or wet soil. The plant can tolerate maritime exposure. It can tolerate atmospheric pollution.

kcaakta Edible Parts: Inner bark Leaves MannaEdible Uses: Inner bark - raw or cooked. It can be dried, ground into a powder and then added to cereal flour for use in making bread etc. A very bitter flavour, it is a famine food that is only used when all else fails[172]. Young shoots - raw or cooked. They are not very palatable[172]. The source of an edible manna[183]. No further details.

tcanta Basketry Charcoal Hedge Hedge Leather Pioneer Shelterbelt Tannin WoodLandscape Uses: Border, Massing, Pollard, Standard, Specimen. The stems are very flexible and are used in basket making[61]. The plant is usually coppiced annually when grown for basket making, though it is possible to coppice it every two years if thick poles are required as uprights. The bark is tough and flexible, it is used as a substitute for leather[115]. The bark contains around 10% tannin[223]. The plant is fast growing and tolerant of maritime exposure, it can be used as a windbreak hedge and shelterbelt though it is of untidy habit[75]. The seeds are very light and so can travel some distance in the wind. The plant is therefore able to find its way to areas such as cleared woodland where the soil has been disturbed. Seedlings will grow away quickly, even in exposed conditions and the plant will provide good shelter for the establishment of woodland plants. Thus it makes a good pioneer species and, except in wetter and moorland-type soils, will eventually be largely

out-competed by the other woodland trees. Its main disadvantage as a pioneer plant is that it has an extensive root system and is quite a greedy plant, thus it will not help as much in enriching the soil for the other woodland plants as other pioneer species such as the alders, *Alnus* species[K]. Some cultivars can be grown as ground cover[208]. 'Pendula' is female whilst 'Kilmarnock' is a male, they should be spaced about 1.5 metres apart each way[208]. Wood - soft, elastic, easily split. Used for baskets, rugs etc[46, 61]. A good quality charcoal is made from the wood[46, 61]. Dynamic accumulator.

dwatta Anodyne Aphrodisiac Astringent Febrifuge Ophthalmic StimulantThe fresh bark of all members of this genus contains salicin[226], which probably decomposes into salicylic acid (closely related to aspirin) in the human body[213]. This is used as an anodyne and febrifuge[226]. A decoction of the leaves is used in the treatment of fevers[240]. A distilled water from the flowers is aphrodisiac, cordial and stimulant[240]. It is used externally in the treatment of headaches and ophthalmia[240]. The ashes of the wood are useful in the treatment of haemoptysis[240]. The stems and the leaves are astringent[240]. A gum and the juice of the trees are used to increase visual powers[240].

nrakta Europe, including Britain, from Norway south and east to Spain, temperate Asia and Syria. ksacta Woods, scrub and hedges, usually on basic soils, to 840 metres[17].

propta Seed - must be surface sown as soon as it is ripe in late spring. It has a very short viability, perhaps as little as a few days. Cuttings of mature wood of the current year's growth, November to February in a sheltered outdoor bed or planted straight into their permanent position and given a good weed-suppressing mulch. Cuttings of this species do not root well[200]. Plant into their permanent positions in the autumn. Cuttings of half-ripe wood, June to August in a frame. Cuttings of this species do not root well[200].

nwatta Succeeds in most soils, including wet, ill-drained or intermittently flooded soils[1], but prefers a damp, heavy soil in a sunny position. Grows in drier soils than any other British species of *Salix*[186]. Rarely thrives on chalk[200]. Plants are found most frequently on basic soils in the wild[17]. Tolerates atmospheric pollution and exposed positions, including maritime exposure[75, 186]. A fast growing tree, it establishes well[75]. The tree has an untidy habit[75]. A light demanding tree, it becomes tall and drawn when grown in woodland, though it grows well along the sunnier edges[186]. Hybridizes freely with other members of this genus[200]. Although the flowers are produced in catkins early in the year, they are pollinated by bees and other insects rather than by the wind[11]. Trees are very tolerant of cutting, they coppice well[186]. Plants in this genus are notably susceptible to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required. Special Features: Not North American native, Wetlands plant, Attractive flowers or blooms.

5.2.505 *Ilex pedunculosa*

4 tin 8 cyuc 1 kcaak 0 tcan 1 dwat 10 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikhwisslip hpa7tmwatli nyanhjen hjonli

drutta *Ilex pedunculosa* is an evergreen Shrub growing to 10 m (32ft) by 6 m (19ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, in flower in June, and the seeds ripen from October to November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific reports of toxicity have been seen for this species, the fruits of at least some members of this genus contain saponins and are slightly toxic. They can cause vomiting, diarrhoea and stupor if eaten in quantity[274].

kcaakta Edible Parts: LeavesEdible Uses: Young leaves - cooked[177, 178]. Some caution is advised, see the notes above on toxicity.

tcanta Dye WoodA dark red dye is obtained from the leaves[178]. Wood - white, beautifully veined[178].

dwatta Carminative Skin TonicCarminative, skin, tonic[178].

nrakta E. Asia - China, Japan. ksacta Woods in mountains of Japan[184]. Woodlands and the sides of streams in W. China[109]. Broad-leaf woods, thickets, margins of woods on mountains at elevations of 1200 - 1900 metres in China[266].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. It can take 18 months to germinate. Stored seed generally requires two winters and a summer before it will germinate and should be sown as soon as possible in a cold frame. Scarification, followed by a warm stratification and then a cold stratification may speed up the germination time[78, 80]. The seedlings are rather slow-growing. Pot them up into individual pots when they are large enough to handle and grow them on in light shade in a cold frame for their first year. It is possible to plant them out into a nursery bed in late spring of the following year, but they should not be left here for more than two years since they do not like being transplanted. Alternatively, grow them on in their pots for a second season and then plant them out into their permanent positions in late spring or early summer. Give them a good mulch and some protection for their first winter outdoors. Cuttings of almost ripe wood with a heel, August in a shaded position in a cold frame. Leave for 12 months before potting up. Layering in October. Takes 2 years.

nwatta Succeeds in most soils so long as they are not water-logged. Plants are hardy to about -10°C[184]. Resents root disturbance, especially as the plants get older[11]. It is best to place the plants into their permanent positions as soon as possible, perhaps giving some winter protection for their first year or two[K]. Plants are very tolerant of pruning and can be cut right back into old wood if required[188]. Dioecious. Male and female plants must be grown if seed is required.

5.2.506 Sorbus pohnuashanensis

4 tlin 8 cyuc 1 kcaak 0 tcan 0 dwat 10 m hkuc
hmimhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli fyfjxre7t hjonli

drutta Sorbus pohnuashanensis is a deciduous Tree growing to 10 m (32ft) by 8 m (26ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

pcista The seeds probably contain hydrogen cyanide. This is the ingredient that gives almonds their characteristic flavour. Unless the seed is very bitter it should be perfectly safe in reasonable quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

ksacta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. A rather bitter flavour[K]. The fruit is up to 6 - 8mm in diameter[200] and is borne in fairly large bunches which makes harvesting easier[K].

nrakta E. Asia - N. China. ksacta Mountain slopes and mixed forests in valleys at elevations of 900 - 2500 metres in Gansu, Hebei, Heilongjiang, Jilin, Liaoning, Nei Mongol, Shaanxi, Shandong and Shanxi Provinces[266].

propta Seed - best sown as soon as it is ripe in a cold frame[78, 80]. If you have sufficient seed it can be sown in an outdoor seedbed[78, 80]. Stored seed germinates better if given 2 weeks warm then 14 - 16 weeks cold stratification[98], so sow it as early in the year as possible. Prick out the seedlings into individual pots when they are large enough to handle. Seedlings are very slow to put on top-growth for their first year or two[11], but they are busy building up a good root system. It is best to keep them in pots in a cold frame for their first winter and then plant them out into their permanent positions in late spring.

nwatta Succeeds in most reasonably good soils in an open sunny position[11]. Dislikes dry soils[188]. Tolerates

light shade[188], though it fruits better in a sunny position[K]. A fast-growing tree, especially in its first few years from seed[K]. Plants are susceptible to fireblight[188].

5.2.507 Sorbus hybrida

Swedish Service Tree, Oakleaf mountain ash

4 tlin 8 cyuc 1 kcaak 0 tcan 0 dwat 9 m hkuc
hmimhtut cyutli tcup hwicli hrasljutnyik hpa7tli frusflatprikli-wissliip hpa7tmwatli fyfjxre7t hjonli

drutta Sorbus hybrida is a deciduous Tree growing to 9 m (29ft 6in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects, Apomictic (reproduce by seeds formed without sexual fusion). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

pcista The seeds probably contain hydrogen cyanide. This is the ingredient that gives almonds their characteristic flavour. Unless the seed is very bitter it should be perfectly safe in reasonable quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

ksacta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[3]. The fruit is up to 10 - 12mm across[200] and is produced in fairly large bunches, making harvesting easier[K].

nrakta Europe - S. and S.W. Scandinavia. ksacta Usually found near the coast[11].

propta Seed - best sown as soon as it is ripe in a cold frame[78, 80]. If you have sufficient seed it can be sown in an outdoor seedbed[78, 80]. Stored seed germinates better if given 2 weeks warm then 14 - 16 weeks cold stratification[98], so sow it as early in the year as possible. Prick out the seedlings into individual pots when they are large enough to handle. Seedlings are very slow to put on top-growth for their first year or two[11], but they are busy building up a good root system. It is best to keep them in pots in a cold frame for their first winter and then plant them out into their permanent positions in late spring.

nwatta Succeeds in most reasonably good soils in an open sunny position[11]. Tolerates very acid or alkaline soils[11]. Tolerates light shade[188], though it fruits better in a sunny position[K]. Plants are susceptible to fireblight[188]. The trees usually have apomictic flowers. They thus produce seed asexually, each seedling being a clone of the parent[11].

5.2.508 Euonymus hamiltonianus

Hamilton's spindle tree

4 tlin 8 cyuc 1 kcaak 0 tcan 0 dwat 9 m hkuc
hmimhtut cyutli kyuctup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Euonymus hamiltonianus is a deciduous Shrub growing to 9 m (29ft 6in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Although no records of toxicity have been seen for this species, a number of plants in this genus are suspected of being poisonous and so some caution is advised.

ksacta Edible Parts: LeavesEdible Uses: Young leaves - boiled[105, 177]. This report should be treated with some caution since many members of this genus are poisonous.

tcanta Latex WoodRoots and stem yield gutta-percha, a non elastic rubber used as an electrical insulator and in making plastics etc[74]. Wood - heavy, hard, close-grained. Used

5.2.519 Salix purpurea

Purple Osier. purpleosier willow

4 tlin 8 cyuc 1 kcaak 4 tcan 3 dwat 5 m hkuc
htut cyutli kyuctuphja7n hwicli hrasljutnyikfrrip hpa7tli flatprikliwisom hpa7tmwatli nyanhjen hjonli

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

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

ksacta Edible Parts: Inner bark LeavesEdible Uses: Inner bark - raw or cooked. It can be dried, ground into a powder and then added to cereal flour for use in making bread etc. A very bitter flavour, it is a famine food that is only used when all else fails[172]. Young shoots - raw or cooked. They are not very palatable[172].

tcanta Basketry Fodder Hedge Hedge Repellent Soil reclamation Soil stabilization TanninThe stems are very tough and flexible and are used in basket making[11, 13, 23, 115]. The plant is usually coppiced annually when grown for basket making, though it is possible to coppice it every two years if thick poles are required as uprights. The bark is much disliked by rabbits, so a closely woven fence of this plant can be used as a protective barrier[115]. The bark contains about 10% tannin[223]. Plants can be grown as a hedge[29], the var. 'Gracilis' is suitable for a small hedge on damp sites[182, 200]. It can be kept dense by annual clipping[11]. The plant has an extensive root system and is used in soil reclamation and stabilization projects along estuaries[199]. Dynamic accumulator.

dwatta Anodyne Antiinflammatory Antiperiodic Antiseptic Astringent Diaphoretic Diuretic Dysentery Febrifuge Hypnotic Sedative TonicThe bark is anodyne, anti-inflammatory, antiperiodic, antiseptic, astringent, diaphoretic, diuretic, febrifuge, hypnotic, sedative and tonic[4, 9, 21]. It is a very rich source of salicin, which is used in making aspirin[199]. The bark of this species is used interchangeably with S. alba. It is taken internally in the treatment of rheumatism, arthritis, gout, inflammatory stages of auto-immune diseases, diarrhoea, dysentery, feverish illnesses, neuralgia and headache[238]. The bark is removed during the summer and dried for later use[238]. The leaves are used internally in the treatment of minor feverish illnesses and colic[238], cancerous sores and chronic dysentery[218]. The leaves can be harvested throughout the growing season and are used fresh or dried[238]. The twigs are used in the treatment of cancer, dysentery and ulcers[218]. The bark of the stem and roots is anodyne and styptic[218]. It is used in the treatment of rheumatism[218]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Salix / Willow for diseases accompanied by fever, rheumatic ailments, headaches (see [302] for critics of commission E).

nrakta Europe, including Britain, from Belgium south and east to N. Africa, temperate Asia to Japan. ksacta Wet places in lowland areas[13, 17], preferring neutral or alkaline soils[186].

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

nwatta Agroforestry Services: Windbreak Fodder: Bank Industrial Crop: Biomass Management: Coppice Other Systems: SRC Regional CropSucceeds in most soils, including wet, ill-drained or intermittently flooded soils[1, 11], but prefers a damp, heavy soil in a sunny po-

sition[200]. Plants prefer an alkaline or neutral soil, rarely doing well in acid conditions[186]. Said to prefer a sandy soil[23, 199], plants are tolerant of dryish soils[11]. Plants are tolerant of salt water[199]. A very ornamental plant[1], it is cultivated for its branches which are used in basket making[11], there are some named varieties[131]. Plants are coppiced annually for this purpose[186] A very important food plant for the caterpillars of many butterfly species[30] and a good bee plant, providing an early source of nectar and pollen[11]. Plants in this genus are notably susceptible to honey fungus[200]. Plants should be put into their permanent positions as soon as possible[11]. Dioecious. Male and female plants must be grown if seed is required.

5.2.520 Miscanthus sinensis

Eulalia, Chinese silvergrass, Silver Feather, Eulalia Grass, Japanese Silver Grass, Ornamental Grass
4 tlin 9 cyuc 1 kcaak 0 tcan 2 dwat 4 m hkuc
hmimhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Miscanthus sinensis is a PERENNIAL growing to 4 m (13ft) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

ksacta Edible Parts: StemEdible Uses: Immature flowering spike[105, 177]. No further details are given.

tcanta BiomassBeing increasingly grown as a source of biomass, trials are currently (1992) taking place on its potential in Britain[K]. Plants form impenetrably dense clumps and when planted close together in drifts make an excellent ground cover[200].

dwatta Anticoagulant Diuretic FebrifugeThe juice of young stems is used to disperse poisons, dissolve blood clots, dissipate extravasated blood and remove inflammation[218]. The plant is diuretic and refrigerant[147, 218].

nrakta E. Asia - China, Japan, Korea. ksacta Moist meadows on slopes in lowland and mountains all over Japan[58, 200].

propta Seed - surface sow in spring in a greenhouse and keep moist. Germination should take place within a couple of weeks. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring or early autumn[200]. Very easy, large divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Industrial Crop: Biomass Management: Hay Minor Global CropLandscape Uses:Border, Container, Foundation, Ground cover, Rock garden, Seashore, Specimen. Prefers a deep fertile loamy soil that does not dry out in summer[200] but succeeds in any ordinary soil that is not too dry[1, 162], in sun or light shade[200]. Fully dormant plants are hardy to about -20°C[187], though the young growth in spring can be damaged by late frosts. Often grown as an ornamental plant, there are many named varieties[162]. Many forms do not get enough summer heat to flower freely when they are grown in Britain. 'Silberfeder' (syn 'Silver Feather') is the most free-flowering in cooler climates[187]. Plants can be grown as a focal point in lawns, they also succeed in quite coarse grass[233]. The leaves have saw-toothed edges that can cut the unwary gardener, it is best to wear gloves when working with the plant[200]. Plants seem to be immune to the predations of rabbits[233]. Special Features: Attracts birds, Attractive foliage, Not North American native, Suitable for cut flowers, Suitable for dried flowers, Attractive flowers or blooms.

nrakta Eastern N. America - Florida and Texas north to New Jersey, Ohio and Missouri. ksacta Rich moist soils by the edges of streams and in damp woods and scrub[43, 55, 82].

propta Seed - best sown as soon as it is ripe in a cold frame[164, 200]. Germination is usually good. Stored seed can be sown in February or March in a warm greenhouse according to one report[78] but germination can then take 18 months at 15 - 20°C[113]. Alternatively the stored seed can be pre-soaked for 2 - 3 hours in warm water and then given 3 months warm stratification followed by 3 months at 2 - 4°C[113]. Germination can then be fairly rapid. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a greenhouse or cold frame. Plant them out into their permanent positions the following spring or early summer. Layering in early summer as soon as new growth is long enough. Takes 15 months[78]. Layering can also be carried out in spring or autumn[200].

nwatta Landscape Uses:Border, Pest tolerant, Specimen, Woodland garden. Prefers a good loamy neutral to acid soil in full sun[1, 11, 182, 200]. Succeeds in partial shade but does not fruit so well in such a position[200]. Plants flower more freely in areas with hotter summers[188] and are slow-growing in areas with cool summers[238]. A very ornamental plant[1, 11], it is hardy to about -25°C[184]. A fast-growing but short-lived tree in the wild, where it is remarkably free from diseases or insect pests[229]. Plants begin to flower and bear fruit when they are 5 - 8 years old[227]. The flowers have a delicate sweet perfume[245]. Dioecious, male and female plants must be grown if seed and fruit is required. This species transplants easily[11]. Plants in this genus are notably resistant to honey fungus[200]. Special Features:Attracts birds, North American native, Fragrant flowers, Blooms are very showy.

5.2.517 Viburnum lantana

Wayfaring Tree, Wayfaring Tree Viburnum
4 tlin 7 cyuc 1 kcak 0 tcan 0 dwat 5 m hkuc
hmimhtut cyutli kyuctcup hwicli hraslutnyikfrp hpa7tli flatprikwlis hpa7tmwatli wfykxre7t hjonli

drutta Viburnum lantana is a deciduous Shrub growing to 5 m (16ft) by 4 m (13ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from May to June, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. It cannot tolerate atmospheric pollution.

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

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. A famine food, it is only used when all else fails[177]. The oblong fruit is about 8mm long and contains a single large seed[200].

tcanta Rootstock StringThe young stems can be used as a twine[6]. This species is used as a rootstock for all forms of viburnums that require grafting[202].

nrakta Europe, including Britain, from Belgium south and east to Spain, Greece and W. Asia. ksacta Open woodland and woodland edges, especially on calcareous soils[10, 17].

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

in late spring or early summer of the following year. Cuttings of half-ripe wood, 5 - 8 cm long with a heel if possible, July/August in a frame[78, 113]. Plant them into individual pots as soon as they start to root. These cuttings can be difficult to overwinter, it is best to keep them in a greenhouse or cold frame until the following spring before planting them out[113]. Cuttings of mature wood, winter in a frame. They should root in early spring - pot them up when large enough to handle and plant them out in the summer if sufficient new growth is made, otherwise keep them in a cold frame for the next winter and then plant them out in the spring. Layering of current seasons growth in July/August. Takes 15 months[78].

nwatta Landscape Uses:Border, Massing, Screen, Specimen. An easily grown plant, it succeeds in most soils but is ill-adapted for poor soils and for dry situations[1]. Unlike most members of the genus, this species succeeds on dry soils[186]. It prefers a deep rich moist loamy soil in sun or semi-shade[11, 200], growing well on chalk and on chalky clays[98]. Intolerant of water-logged soils[186]. Best if given shade from the early morning sun in spring[200]. Dislikes atmospheric pollution[186]. Plants regenerate well after cutting[186]. This plant is a good indicator of limy soils[186]. Tolerates light shade in a woodland[186]. One report says the plant is self-sterile[11], another that it is self-fertile[17]. It would be wise to grow at least two genetically distinct plants of the same species in order to make sure that fruit and seed is produced. Special Features: Not North American native, Naturalizing, Fragrant flowers, Blooms are very showy.

5.2.518 Magnolia stellata

Star Magnolia
4 tlin 8 cyuc 1 kcak 0 tcan 0 dwat 5 m hkuc
hmimhtut cyutli tcup hwicli hraslutnyik hpa7tli flatprikwlis hpa7tmwatli xre7t hjonli

drutta Magnolia stellata is a deciduous Shrub growing to 5 m (16ft) by 5 m (16ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from March to April. The species is hermaphrodite (has both male and female organs) and is pollinated by Beetles. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. It can tolerate atmospheric pollution.

kcakta Edible Parts: LeavesEdible Uses: Young leaves - cooked. A famine food, it is only used when all else fails[177]. nrakta E. Asia - Japan. ksacta Woods in mountains. Found only in the mountains to the north-east of Nagoya[11]. propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed must be kept cold over the winter and should be sown in late winter in a cold frame[200]. The seed usually germinates in the spring but it can take 18 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for at least their first winter. They can be planted out into their permanent positions when they are more than 15cm tall, though should be well mulched and given some protection from winter cold for their first winter or two outdoors. Layering in early spring[200]. Cuttings of half-ripe wood, early summer in a frame[202].

nwatta Landscape Uses:Border, Firewood, Pest tolerant, Specimen. Best grown in a warm position in a moderately rich free soil of an open texture[1]. Succeeds in acid or neutral soils in sun or part shade[184]. Tolerates alkaline soils so long as they are deep and rich in humus[188]. Prefers plenty of humus in the soil[11]. The branches are brittle so a sheltered position is required[200]. Very tolerant of atmospheric pollution[200]. Dormant plants are hardy to about -15°C[184]. The fleshy roots are easily damaged and any transplanting is best done during a spell of mild moist weather in late spring[182]. A very ornamental plant, the flowers start to be produced when the plant is only 2 years old and have a delicate sweet perfume[245], though they are easily damaged by frost or wind[1]. A number of cultivars have been developed for their ornamental value[200]. Plants are slow-growing[202]. Very closely related to *M. kobus* and possibly no more than a geographical form of that species[182]. Special Features: Not North American native, Fragrant flowers, Blooms are very showy .

for mosaic, printing blocks etc[46]. Th wood is used to make combs[272].

nrakta E. Asia - Afghanistan to China. ksacta Scrub woods to 2700 metres[184]. Open places around villages at elevations of 500 - 2500 metres in Nepal[272].

propta Seed - best sown as soon as it is ripe in a cold frame[113]. Stored seed requires 3 months cold stratification so should be sown as early in the year as possible in a cold frame[113]. The seed can take 18 months to germinate[74]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, taken at a node, July/August in a frame. Very easy[200]. Root cuttings in winter[113].

nwatta Thrives in almost any soil, including chalk, it is particularly suited to dry shaded areas[200]. Prefers a well-drained loamy soil. Plants are hardy to about -15°C[184]. A very ornamental plant[1], there are a number of named varieties selected for their good fruiting and autumn colour[184].

5.2.509 Rhus succedanea

Wax Tree
4 tlin 9 cyuc 1 kcak 4 tcan 2 dwat 9 m hkuc
htut cyutli tcup hwicli hraslutnyik hpa7tli flatprikwlis hpa7tmwatli nyanhjen hjonli

drutta Rhus succedanea is a deciduous Tree growing to 9 m (29ft) by 9 m (29ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in July, and the seeds ripen from September to November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista This plant contains toxic substances which can cause severe irritation to some people. The fresh sap causes skin blisters[145]. The leaves contain the ubiquitous carcinogen shikimic acid[218].

kcakta Edible Parts: Fruit OilEdible Uses: Drink Oil-Fruit[105]. The acid pulp is eaten[158, 272]. The edible fruit contains ellagic acid[218]. These reports need to be treated with some caution due to the general toxicity of the species[K].

tcanta Dye Lacquer Mordant Oil Varnish WaxThe leaves contain about 20% tannin[218]. They can be collected as they fall in the autumn and used as a brown dye or as a mordant[169]. The sap is tapped and used as a lacquer[57, 64, 146, 158, 171]. It is much used in Japanese art and needs to be kept in a cool humid place for it to dry properly. The Japanese traditionally kept their paintings in a damp cave until the lacquer had dried. A yellow dye is obtained from the wood[178]. A wax obtained from the fruit is used to make candles, floor wax, varnish etc[1, 4, 11, 51, 64, 158, 171]. The fruit contains about 17% wax[174]. The fatty acid composition of the wax is 77% palmitic, 5% stearic and arachidic, 6% dibasic, 12% oleic and a trace of linoleic[218]. The seed oil contains 25% glycerides of palmitic, 47% oleic and 28% linoleic[218].

dwatta Antidote Antivinous Cancer Cholagogue Febrifuge OphthalmicAntidote, antivinous, cholagogue, febrifuge, ophthalmic. Used as a wash to counteract varnish poisoning[178]. Use with extreme caution, see notes above on toxicity. The fruit is used in the treatment of phthisis[240]. A wax from the fruits is used in ointments[218]. An ethanolic extract of the leaves exhibits anticancer and antiviral activities[218].

nrakta E. Asia - China, Japan, Himalayas. ksacta Forests and shrubberies to 2,400 metres in the Himalayas[51]. Lowland and hill forests, lowland thickets on limestone; at elevations from 100 - 1,500 metres, occasionally to 2,500 metres[266].

propta Seed - best sown in a cold frame as soon as it is ripe. Pre-soak the seed for 24 hours in hot water (starting at a temperature of 80 - 90c and allowing it to cool) prior to sowing in order to leach out any germination inhibitors[200].

The stored seed also needs hot water treatment and can be sown in early spring in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 10cm with a heel, July/August in a frame[200]. Root cuttings 4cm long taken in December and potted up vertically in a greenhouse. Good percentage[78, 200]. Suckers in late autumn to winter[200].

nwatta Industrial Crop: Oil Industrial Crop: Wax Management: Standard Regional CropSucceeds in a well-drained fertile soil in full sun[11, 200]. Plants are not very hardy in Britain, though they succeed outdoors in the mildest areas of the country[1, 11]. The young growth in spring can be damaged by late frosts. Plants have brittle branches and these can be broken off in strong winds[200]. Plants are also susceptible to coral spot fungus[11]. Plants in this genus are notably resistant to honey fungus[200]. This species is frequently cultivated in Japan for its sap and the wax obtained from its fruit[11]. Many of the species in this genus, including this one, are highly toxic and can also cause severe irritation to the skin of some people, whilst other species are not poisonous. It is relatively simple to distinguish which is which, the poisonous species have axillary panicles and smooth fruits whilst non-poisonous species have compound terminal panicles and fruits covered with acid crimson hairs[1, 4]. The toxic species are sometimes separated into their own genus, Toxicodendron, by some botanists[200]. Dioecious. Male and female plants must be grown if seed is required.

5.2.510 Rhamnus dahurica

Dahurian Buckthorn
4 tlin 8 cyuc 1 kcak 0 tcan 1 dwat 7 m hkuc
hmimhtut cyutli tcup hwicli hraslutnyik hpa7tli flatprikwlis hpa7tmwatli xre7t hjonli

drutta Rhamnus dahurica is a deciduous Shrub growing to 7 m (23ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in June, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention of toxicity has been found for this species, there is the suggestion that some members of this genus could be mildly poisonous[65].

kcakta Edible Parts: Leaves OilEdible Uses: Oil TeaLeaves - cooked. They can be parboiled and eaten[183]. The leaves are a tea substitute[177, 183].

tcanta Dye Hedge Hedge Miscellany Oil WoodA green dye is obtained from the leaves and branches[46, 61, 151]. A yellow dye can be obtained from the bark and the fruit[266]. A lubricating oil is obtained from the seeds[266]. Plants can be grown as an informal hedge, they are also amenable to trimming[200]. The hard wood can be used to make furniture[266].

dwatta MiscellanyThe fleshy fruit is used as medicine[266]. No more details are given.

nrakta E. Asia - Siberia to China. ksacta Forest undergrowth in the Himalayas[146]. Forests on slopes, thickets or the margin of forests, humid places along the sides of canals at elevations under 1800 metres in China[266].

propta Seed - best sown in the autumn in a cold frame. Stored seed will require 1 - 2 months cold stratification at about 5° and should be sown as early in the year as possible in a cold frame or outdoor seedbed[200]. Germination is usually good, at least 80% by late spring. Prick out the seedlings into individual pots when they are large enough to handle, and grow them on in the greenhouse or cold frame for their first winter. Plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame[113]. Cuttings of mature wood of the current year's growth, autumn in a frame. Layering in early spring[4].

nwatta An easily grown plant, it succeeds in any reasonably good soil[11]. This species is very closely related to *R.*

cathartica[11]. The species in this genus are notably resistant to honey fungus[200].

5.2.511 *Celastrus flagellaris*

4 tlin 8 cyuc 1 kcaak 0 tcan 1 dwat 7.5 m hkuu hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli nyanhjen hjonli

drutta *Celastrus flagellaris* is a deciduous Climber growing to 7.5 m (24ft 7in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in June, and the seeds ripen in October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young leaves - cooked[105, 177].

dwatta CancerMany plants in this genus contain compounds of interest for their antitumor activity[218].

nrakta E. Asia - China, Japan, Korea. ksacta Mountains in S. Japan[58]. Valley, forest on riverside, thickets and sunny slopes in China[266].

propta Seed - gather when ripe, store in dry sand and sow February in a warm greenhouse[78]. Three months cold stratification leads to a higher germination rate[113]. Remove the aril since this inhibits germination[113]. Germination rates are usually good[78]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Layering in August of the current seasons growth. Takes 12 months[78]. Root cuttings, 6mm thick 25mm long in December. Plant horizontally in pots in a frame[78].

nwatta Prefers a deep loamy soil[11]. A gross feeder, it requires a rich soil[11]. A rampant climber, it requires ample space and is best grown in an old tree[1, 200]. Fruits best when its top growth is in a sunny position[182]. Plants climb by means of twining and by hooked prickles[182]. They do not normally require pruning[219]. Plants in this genus are notably resistant to honey fungus[200]. Dioecious, male and female plants must be grown if seed is required.

5.2.512 *Euonymus hamiltonianus sieboldianus*

4 tlin 8 cyuc 1 kcaak 0 tcan 0 dwat 6 m hkuu hmimhtut cyutli kyuctup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Euonymus hamiltonianus sieboldianus* is a deciduous Shrub growing to 6 m (19ft) by 6 m (19ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Although no records of toxicity have been seen for this species, a number of plants in this genus are suspected of being poisonous and so some caution is advised.

kcakta Edible Parts: LeavesEdible Uses: Young leaves - they must be well boiled[105, 177]. This report should be treated with some caution since many members of this genus are poisonous.

tcanta Latex WoodRoots and stem yield gutta-percha, a non elastic rubber used as an electrical insulator and in making plastics etc[61, 103]. Wood - heavy, hard, close-grained. Used for mosaic, printing blocks etc[46].

nrakta E. Asia - Japan. ksacta Mountains and hills throughout Japan[58].

propta Seed - best sown as soon as it is ripe in a cold frame[113]. Stored seed requires 3 months cold stratification so should be sown as early in the year as possible in a cold frame[113]. The seed can take 18 months to germinate[74]. When they are large enough to handle, prick the

seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, taken at a node, July/August in a frame. Very easy[200]. Root cuttings in winter[113].

nwatta Thriving in almost any soil, including chalk, it is particularly suited to dry shaded areas[200]. Prefers a well-drained loamy soil[11]. This species is often called *E. yedoensis* in the garden[11].

5.2.513 *Lonicera caprifolium*

Italian Honeysuckle, Italian woodbine
4 tlin 8 cyuc 1 kcaak 0 tcan 2 dwat 6 m hkuu pcmhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Lonicera caprifolium* is a deciduous Climber growing to 6 m (19ft) by 6 m (19ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from August to September, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Lepidoptera (Moths and Butterflies). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: TeaThe fruit is eaten in small quantities[177]. It is probably cooked first[K]. An infusion of the heavily perfumed flowers is used as a tea substitute[7].

tcanta EssentialAn essential oil has been extracted from the flowers and used to make a very sweet perfume, but yields are extremely low[7].

dwatta Antispasmodic Bach Cathartic Diuretic Emetic Emollient Expectorant Laxative Pectoral Skin VulneraryThe fruit is emetic and cathartic[4]. The pressed juice makes a mild purgative[7, 61]. The leaves and flowers are antispasmodic, emollient and expectorant[7]. They are used as a cutaneous and mucous tonic and as a vulnerary[4]. Recent research has shown that the plant has an outstanding curative action in cases of colitis[7]. The seed is diuretic[4]. The plant is used in Bach flower remedies - the keywords for prescribing it are 'Dwelling upon thoughts of the past', 'Nostalgia' and 'Homesickness'[209].

nrakta Europe - Austria and Czechoslovakia to Romania and Turkey. Introduced in Britain. ksacta Hedges, scrub and woods[100].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed requires 2 months cold stratification[113] and should be sown as soon as possible in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7-10cm with or without a heel, July/August in a frame. Good percentage[78]. Cuttings of mature wood of the current season's growth, 15-20cm with or without a heel, November in a cold frame. Good percentage[78]. Layering in autumn[200].

nwatta Prefers a good moist soil with its roots in the shade and its top growing into the light[200]. Succeeds even in quite deep shade[219]. Tolerates both acid and alkaline soils, only showing distress on very alkaline soils[202]. Plants are hardy to about -15°c[202]. Plants are moderately fast-growing[202]. They climb by twining around other plants[182]. The flowers are very fragrant, especially of a night time in order to attract pollinating moths, and are produced in abundance[202, 219, 245], but plants only produce fruit after a hot summer[202]. Plants are prone to attacks by mildew and blackfly[202].

5.2.514 *Lonicera henryi*

4 tlin 8 cyuc 1 kcaak 0 tcan 1 dwat 6 m hkuu hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Lonicera henryi* is an evergreen Climber growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy

to UK zone 4. It is in leaf all year; in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers Leaves StemEdible Uses: Edible flowers, leaves and stems[105, 177, 183]. No further details are given, but some caution is advised because this genus contains a number of mildly toxic plants[K].

tcanta MiscellanyA very vigorous climbing plant, it makes a good dense ground cover plant where it has the space to run along the ground, but it will swamp smaller plants[197].

dwatta MiscellanyThe plant is used medicinally in China, but the report gives no more details[218].

nrakta E. Asia - China from W. Hubei to W. Sichuan. ksacta Scrub, 1200 - 2300 metres[184].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed requires 2 months cold stratification[113] and should be sown as soon as possible in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7-10cm with or without a heel, July/August in a frame. Good percentage[78]. Cuttings of mature wood of the current season's growth, 15-20cm with or without a heel, November in a cold frame. Good percentage[78]. Layering in autumn[200].

nwatta Prefers a good moist soil with its roots in the shade and its top growing up into the light[200]. Plants are hardy to about -20°c[184]. A vigorous climber, supporting itself by twining around other plants[182, 219]. Any pruning is best carried out in the spring[219].

5.2.515 *Salix viminalis*

Osier. Basket Willow
4 tlin 8 cyuc 1 kcaak 3 tcan 2 dwat 6 m hkuu htut cyutli tcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli nyanhjen hjonli

drutta *Salix viminalis* is a deciduous Tree growing to 6 m (19ft) by 4 m (13ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from April to May, and the seeds ripen in June. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees. The plant is not self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist or wet soil. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: Inner bark LeavesEdible Uses: Inner bark - raw or cooked. It can be dried, ground into a powder and then added to cereal flour for use in making bread etc. A very bitter flavour, it is a famine food that is only used when all else fails[172]. Young shoots - cooked. Not very palatable[172].

tcanta Basketry Fodder Soil stabilization TanninThe stems are very flexible and are used in basket making[11, 23, 46]. The plant is usually coppiced annually when grown for basket making, though it is possible to coppice it every two years if thick poles are required as uprights. The annual yield can be around 12 tonnes per hectare, 40% of which is class 1[74]. The bark contains about 10% tannin[223]. Often planted along the banks of rivers and lakes to prevent soil erosion[11].

dwatta Anodyne Antirheumatic FebrifugeAntirheumatic, febrifuge[13]. The fresh bark of all members of this genus contains salicin[226], which probably decomposes into salicylic acid (closely related to aspirin) in the human body[213]. This is used as an anodyne and febrifuge[226].

nrakta Europe, incl Britain, from Scandanavia south and east to France through temperate Asia to Japan. ksacta By rivers and streams, also on deep moist alluvial soils, avoiding very acid soils[186].

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

nwatta Fodder: Bank Industrial Crop: Biomass Industr Crop: Tannin Management: Coppice Other Systems: SRC Regional CropSucceeds in most soils, including wet, ill-drained or intermittently flooded soils[1, 11], but prefers a damp, heavy soil in a sunny position[200]. Dislikes heavy shade and dry soils[186]. Rarely thrives on chalk[200]. Tolerates atmospheric pollution[186]. A fast growing tree, it is very wind resistant[K]. Widely cultivated for basket making, there are many named varieties[11, 17]. Trees are usually coppiced annually for this purpose, they do not respond so well to pollarding. It should be cut back almost to ground level each year when being grown for basket making since this encourages the production of long flexible shoots[11]. In very good conditions plants can put on 4 metres or more of new growth in a year when treated in this way. A very important food source for the caterpillars of many butterfly species[30], it is also a valuable early pollen source for bees[11, 186]. The plants are rich in insect life[186]. Best planted into its permanent position as soon as possible[11]. The root system is rather aggressive and can cause problems with drains[200]. Plants are best not grown within 10 metres of buildings. Plants in this genus are notably susceptible to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required.

5.2.516 *Chionanthus virginicus*

Fringe Tree, White fringetree, Old Man's Beard, Fringe Tree
4 tlin 9 cyuc 1 kcaak 0 tcan 3 dwat 5 m hkuu hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatprikliwssip hpa7tmwatli nyanhjen hjonli

drutta *Chionanthus virginicus* is a deciduous Shrub growing to 5 m (16ft) by 3 m (9ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in June, and the seeds ripen in October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - used as a pickle like olives[55, 177, 183]. The fruit is up to 18mm long, it has a thin pulp and contains 1 - 3 rounded seeds[227].

tcanta WoodWood - hard, heavy, close grained, weighing about 39lb per cubic foot[82, 227]. Of no commercial value because of the small size of the tree[229].

dwatta Alterative Aperient Cholagogue Diuretic Febrifuge TonicThe fringe tree was commonly used by the North American Indians and European settlers alike to treat inflammations of the eye, mouth ulcers and spongy gums[254]. In modern herbalism it is considered to be one of the most reliable remedies for disorders of the liver and gall bladder[238]. The dried root bark is alterative, aperient, cholagogue, diuretic, febrifuge and tonic[4, 21, 46, 222, 238]. It is used in the treatment of gallbladder pain, gallstones, jaundice and chronic weakness[254]. A tincture of the bark was once widely used internally in the treatment of hypertrophy of the liver; jaundice, bilious headache, gallstones, rheumatism etc[222, 238]. The root bark also appears to strengthen function in the pancreas and spleen whilst anecdotal evidence indicates that it may substantially reduce sugar levels in the urine[254]. Fringe tree also stimulates the appetite and digestion and is an excellent remedy for chronic illness, especially where the liver has been affected[254]. A tea or a poultice can be made from the root bark for external use as a wash for wounds, inflammations, sores, infections etc[4, 222]. The roots can be harvested at any time of the year, the bark is peeled from them and is then dried for later use[238].

drutta *Chamaecyparis pisifera* is an evergreen Tree growing to 40 m (131ft) by 25 m (82ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. The flowers are pollinated by Wind. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. It cannot tolerate atmospheric pollution.

tcanta Agroforestry: Boundary, barrier or support. Pioneer. General: Ornamental tree. Limited as a source of timber, but widely cultivated as an ornamental, with many named cultivars. As of other members of the genus, the wood is valued in Japan for traditional construction work, but its relative scarcity and the often poor shape of layering trees limit its commercial use [1-7]. Wood Products: Containers including boxes, cases and coopeage. Furniture. Sawn or hewn building timbers. Beams For heavy and light construction. Shingles. Veneers. Musical instruments [1-7]. Good pioneer species with durable wood. Species and large growing cultivars for lawn specimen, shrub borders and screen. Dwarf cultivars for rock gardens, foundation plantings or specimen.

nrakta Native to central and southern Japan, on the islands of Honsh and Ky sh . ksacta Occurs where sympatric with the more ubiquitous *C. obtusa*, on wetter sites e.g. near mountain streams or in hollows with ground water near the surface. In those wet places trees can spread by the layering of branches to form small groves of clonal individuals. It is a minor constituent in mixed conifer/angiosperm forests. Its altitudinal range is from 280 m to 2600 m a.s.l. [1-7]

propta Seed - sow March/April in a seedbed outdoors[78]. The seed is best sown in pots in a frame[K]. Seed can take 18 months to germinate. One month warm then one month cold stratification has produced good results[113]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter, planting them out in late spring after the last expected frosts. Cuttings in late summer or autumn in sandy soil in a cold frame[1, 11, 200]. Difficult, it may be best done in late winter to early spring[113].

nwatta Average, medium moisture, well-drained soils in full sun to part shade. Best in part shade. Prefers moist, fertile soils. Avoid wet, poorly-drained soils. Shelter from strong winds. Pruning is rarely needed. Winter Interest. Tolerates drought. Good pioneer species with durable wood. A number of varieties exist including: *Chamaecyparis pisifera* form. *crassa* Hayashi. *Chamaecyparis pisifera* form. *intermedia* Hornib. *Chamaecyparis pisifera* var. *filifera* Beiss. et Hochst. *Chamaecyparis* *Chamaecyparis pisifera* var. *plumosa* form. *argenta* Beiss. *Chamaecyparis pisifera* var. *plumosa* form. *aurea* Beiss. *Chamaecyparis pisifera* var. *squarrosa* form. *leptoc* Sieb. A large number of more compact cultivars including some dwarfs are available.

5.2.651 Populus x canescens

Grey Poplar
4 tlin 9 cyuc 0 kcaak 2 tcan 1 dwat 30 m hkuc
htut cyutli tcup hwicli hrasjlutnykfrp hpa7tli flatprikliwis hpa7tmwatli nyanhjen hjonli

drutta *Populus x canescens* is a deciduous Tree growing to 30 m (98ft) by 15 m (49ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from February to March. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerate maritime exposure.

tcanta Shelterbelt WoodA fast growing tree, tolerant of salt winds, it can be grown in a shelterbelt[200]. Wood - soft, rather woolly in texture, without smell or taste, of low flammability, not durable, very resistant to abrasion[11].

dwatta Anodyne Antiinflammatory FebrifugeAlthough no specific mention has been seen for this species, the bark

of most, if not all members of the genus contain salicin, a glycoside that probably decomposes into salicylic acid (aspirin) in the body[213, 238]. The bark is therefore anodyne, anti-inflammatory and febrifuge. It is used especially in treating rheumatism and fevers, and also to relieve the pain of menstrual cramps[238].

nrakta Europe, from Britain and France east to S. Russia, south to Italy and Macedonia. ksacta Probably native in damp woods in S. C. and E. England[17].

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

nwatta An easily grown plant, it does well in a heavy cold damp soil[1]. Prefers a deep rich well-drained circum-neutral soil, growing best in the south and east of Britain[11, 200]. Growth is much less on wet soils, on poor acid soils and on thin dry soils[11]. Plants are reasonably wind tolerant, though they do not grow well in exposed upland sites[11]. They also tolerate salt-laden winds but not saline soils[200]. They dislike shade and are intolerant of root or branch competition[200]. This species is a spontaneous natural hybrid, *P. alba* x *P. tremula*[200]. There are several named forms selected for their ornamental value[200]. Poplars have very extensive and aggressive root systems that can invade and damage drainage systems. Especially when grown on clay soils, they should not be planted within 12 metres of buildings since the root system can damage the building's foundations by drying out the soil[11]. Dioecious. Male and female plants must be grown if seed is required. Hybridizes freely with other members of this genus[200]. Special Features: Not North American native, Inconspicuous flowers or blooms.

5.2.652 Betula schmidtii

Schmidt's Birch
4 tlin 8 cyuc 0 kcaak 3 tcan 0 dwat 30 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnykfrp hpa7tli flatprikliwis hpa7tmwatli hjonli

drutta *Betula schmidtii* is a deciduous Tree growing to 30 m (98ft 5in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in April, and the seeds ripen in September. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

tcanta WoodWood - hard, heavy (it does not float). Used for rollers, mallets etc[151].

dwatta Antiseborrhic UrinaryThe German Commission E Monographs, a therapeutic guide to herbal medicine, approve *Betula* species for infections of the urinary tract, kidney and bladder stones, rheumatism (see [302] for critics of commission E).

nrakta E. Asia - Japan, Korea, Manchuria. ksacta Temperate broad-leaved forests at elevations of 700 - 800 metres[266].

propta Seed - best sown as soon as it is ripe in a light position in a cold frame[78, 80, 113, 134]. Only just cover the seed and place the pot in a sunny position[78, 80, 134].

111, 200]. Grows well in dappled shade[28, 31, 88]. Succeeds in ordinary garden soil[1] and tolerates drier soils[233]. Plants are hardy to at least -20°C[187]. A very ornamental species[233]. The flowers have an unusual, slightly unpleasant smell[188] which is thought to repel insects[213]. Plants grow and flower well in Britain, though they seldom if ever ripen their seed[4]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54]. Special Features: Attractive foliage, North American native, Naturalizing, Suitable for cut flowers, Suitable for dried flowers, Fragrant flowers.

5.2.558 Lonicera utahensis

Utah Honeysuckle
4 tlin 8 cyuc 1 kcaak 0 tcan 1 dwat 1.5 m hkuc
htut cyutli tcup hwicli hrasjlutnyk hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Lonicera utahensis* is a deciduous Shrub growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[212, 257]. The fruit is about 1cm in diameter[60].
dwatta Laxative SalveThe branches are mildly laxative[257]. An infusion of the branches and leaves has been used as a wash on sores and infections[257].

nrakta Western N. America - British Columbia to Oregon, Utah, Wyoming and Montana. ksacta Moist wooded or open slopes at moderate to rather high elevations in the mountains[60].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed requires 2 months cold stratification[113] and should be sown as soon as possible in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm with or without a heel, July/August in a frame. Good percentage[78]. Cuttings of mature wood of the current season's growth, 15 - 20cm with or without a heel, November in a cold frame. Good percentage[78]. Layering in autumn[200].

nwatta Grows best in a good moist soil in a sunny position, it does not fruit so well in the shade[200]. Closely related to *L. canadensis*[212].

5.2.559 Cystopteris montana

Mountain Bladder Fern
4 tlin 8 cyuc 1 kcaak 0 tcan 0 dwat m hkuc
pcimhmim cyutli tcup hwicli hrasjlutnyk hpa7tli flatprikliwis hpa7tmwatli hjonli

drutta *Cystopteris montana* is a deciduous Fern growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 4. The seeds ripen from July to August. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

pcista Although we have found no reports of toxicity for this species, a number of ferns contain carcinogens so some caution is advisable[200]. Many ferns also contain thiaminase, an enzyme that robs the body of its vitamin B complex. In small quantities this enzyme will do no harm to people eating an adequate diet that is rich in vitamin B, though large quantities can cause severe health problems. The enzyme is destroyed by heat or thorough drying, so cooking the plant will remove the thiaminase[172].

kcakta Edible Parts: RootEdible Uses: Root. An emergency food, it is only used when all else fails[172].

nrakta Northern, but not arctic, Europe, including Britain, east to Siberia. Also in northern N. America. ksacta Damp, usually basic, rocks on mountains, 700 - 1100 metres in Northern England and Scotland[17].

propta Spores - best sown as soon as ripe on the surface of a humus-rich sterilized soil. Keep the compost moist, preferably by putting a plastic bag over the pot. Germinates in 1 - 3 months at 20°C[164]. Pot on small clumps of plantlets as soon as they are large enough to handle and keep humid until they are well established. Do not plant outside until the ferns are at least 2 years old. Division in spring.

nwatta Prefers a shady position in a moist but well-drained soil, succeeding in most soil types[200]. Plants can tolerate up to 4 hours direct sun per day[200]. Prefers a pH between 6.5 and 7, but tolerates a range from 5.5 to 7.5[200]. Prefers high humidity, plants die back early in dry seasons[200]. Members of this genus are rarely if ever troubled by browsing deer[233]. A very ornamental plant[1]. Plants spread by means of a creeping rhizome[1].

5.2.560 Kalimeris incisa

4 tlin 8 cyuc 1 kcaak 0 tcan 0 dwat 1.5 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyk hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Kalimeris incisa* is a PERENNIAL growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves and young plants - cooked[105, 177].

nrakta E. Asia - China, Japan, Korea, Siberia. ksacta Meadows and waste ground in lowland C. and S. Japan[58].

propta Seed - sow spring in a greenhouse and only just cover. Keep the compost moist. The seed usually germinates in 2 - 3 weeks at 15°C[138]. Grow on in cool conditions, about 10°C[138]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring. This should be done at least every 3 years in order to maintain the vigour of the plant.

nwatta Prefers a moist loamy soil[138] though it succeeds in most soils[1].

5.2.561 Lycopus europaeus

Gypsywort
4 tlin 8 cyuc 1 kcaak 0 tcan 3 dwat 1 m hkuc
hmimhtut cyutli tcuphja7nhs6s hwicli hrasjlutnyk hpa7tli flatprikliwis hpa7tmwatli fyfxre7t hjonli

drutta *Lycopus europaeus* is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can grow in water.

pcista Known to cause the enlargement of the thyroid gland. Avoid in patients with thyroid disease or given concomitantly with thyroid therapy. Avoid during pregnancy [301].

kcakta Edible Parts: RootEdible Uses: Root - raw or cooked. A famine food, it is only used when all else fails[179].
tcanta Dye MiscellanyA black dye is obtained from the plant[4, 100]. It is said to give a permanent colour and was also used by gypsies in order to darken the skin[4].

dwatta Astringent Miscellany Poultice SedativeThe fresh or dried flowering herb is astringent and sedative[4]. It inhibits iodine conversion in the thyroid gland and is used in the treatment of hyperthyroidism and related disorders[9]. The whole plant is used as an astringent, hypoglycaemic, mild narcotic and mild sedative[4, 238]. It also slows and strengthens heart contractions[238]. The plant has been shown to be of value in the treatment of hyperthyroidism[9,

238], it is also used in the treatment of coughs, bleeding from the lungs and consumption, excessive menstruation etc[4, 238]. The leaves are applied as a poultice to cleanse foul wounds[240]. This remedy should not be prescribed for pregnant women or patients with hypothyroidism[238]. The plant is harvested as flowering begins and can be used fresh or dried, in an infusion or as a tincture[4, 238]. Current uses are predominantly for increased activity of the thyroid gland and for premenstrual syndrome symptoms such as breast pain [301]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve *Lycopus* for nervousness and premenstrual syndrome (see [302] for critics of commission E).

nrakta Europe, including Britain, to the Mediterranean, north and central Asia. ksacta By rivers, streams and ditches, also in marshes and fens[9, 17].

propta Seed - sow spring or autumn in a cold frame[238]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse for their first year. Plant them out into their permanent positions in early summer. Division in spring or autumn[238]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Tolerates most soil types so long as they are wet. Grows well in shallow water. Succeeds in sun or shade.

5.2.562 Staphylea bumalda

4 tlin 8 cyuc 1 kcaok 0 tcan 0 dwat 1.8 m hkuc hmimhtut cyutiI tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Staphylea bumalda is a deciduous Tree growing to 1.8 m (6ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from May to June, and the seeds ripen from September to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young leaves - cooked[105, 177, 179].

nrakta E. Asia - China, Japan, Korea. ksacta Woods and by streams in lowland and hilly areas to 1300 metres, all over Japan[58].

propta Seed - this can be very slow to germinate, sometimes taking 18 months or more. It is best sown as soon as it is ripe in a cold frame[200], and some of it at least should then germinate in the spring. Stored seed should be sown as early in the year as possible and given cold stratification - it might not germinate until spring of the following year. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in the greenhouse for their first winter. Plant them out early the following summer. Cuttings of half-ripe wood, 5 - 8cm with a heel, July/August in a frame. Fair to good percentage[78]. Layering in July/August. Takes 15 months. Good percentage[78].

nwatta Tolerant of a wide range of soils so long as they are not too dry[182, 200], it prefers a rich loamy soil in full sun or semi-shade[1, 11, 200]. The Japanese form of this species is rather tender in Britain[11], but in general plants are hardy to about -25°C[184]. The plants flower best in years that follow hot summers[200]. Plants in this genus are notably resistant to honey fungus[200].

5.2.563 Ranunculus aquatilis

Water Crowfoot, White water crowfoot

4 tlin 8 cyuc 1 kcaok 0 tcan 1 dwat m hkuc hmimhtut cyutiI tcuphja7nhs6s hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyixre7t hjonli

drutta Ranunculus aquatilis is an ANNUAL/PERENNIAL. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies, bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils.

Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can grow in water.

pcista All parts of the plant are poisonous when fresh, the toxins are destroyed by heat or by drying[4, 10, 19, 21, 65]. The plant also has a strongly acrid juice that can cause blistering to the skin[65, 183].

kcakta Edible Parts: LeavesEdible Uses: The entire plant has been boiled and eaten[257]. Some caution is advised, see the notes above on toxicity.

dwatta Antiasthmatic Antirheumatic FebrifugeThe subspecies *R. aquatilis capillaceus* is used is used in India in the treatment of intermittent fevers, rheumatism and asthma[240].

nrakta Most of Europe, including Britain. ksacta Ponds, ditches and streams throughout lowland Britain[17].

propta Seed - sow spring in a tray of water in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta A plant of boggy soils and shallow water, it prefers a loamy soil and a sunny position. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

5.2.564 Viburnum mongolicum

4 tlin 8 cyuc 1 kcaok 0 tcan 0 dwat m hkuc hmimhtut cyutiI tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli dyatxre7t hjonli

drutta Viburnum mongolicum is a deciduous Shrub growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[179].

nrakta E. Asia - E. Siberia. ksacta Not known

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

nwatta An easily grown plant, it succeeds in most soils but is ill-adapted for poor soils and for dry situations[1]. It prefers a deep rich loamy soil in sun or semi-shade[1, 200]. Best if given shade from the early morning sun in spring[200]. Plants are self-incompatible and need to grow close to a genetically distinct plant in the same species in order to produce fruit and fertile seed[11, 200]. This species is closely related to *V. dilatatum*[179].

nrakta Most of Europe, including Britain, east to N. and W. Asia. ksacta Waste places usually on heavy soil[4, 17].

propta Seed - best sown outdoors as soon as it is ripe. Most of the seed germinates in the autumn.

nwatta Prefers a sunny position and a well-drained soil that is neutral to slightly acid[1, 200]. Succeeds in heavy clay soils. Bees dislike this plant[4]. The leaves contain glands which release a most disagreeable odour when the plant is handled and can cause allergic reactions in people.

5.2.648 Populus x canadensis

Canadian Poplar, Carolina Poplar

4 tlin 9 cyuc 0 kcaak 3 tcan 1 dwat 40 m hkuc htut cyutiI tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli nyanhjen hjonli

drutta Populus x canadensis is a deciduous Tree growing to 40 m (131ft) by 12 m (39ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

tcanta Rooting hormone Shelterbelt WoodAn extract of the shoots can be used as a rooting hormone for all types of cuttings. It is extracted by soaking the chopped up shoots in cold water for a day[172]. A fast-growing and wind resistant tree, it can be used in a shelterbelt planting[11, 200]. In more exposed sites there is some wind-pruning[11]. The tree is late coming into leaf and so often escapes the spring storms[11]. Wood - soft, rather woolly in texture, without smell or taste, of low flammability, not durable, very resistant to abrasion[11]. Wood - soft, moderately strong, easily worked, rather woolly in texture, without smell or taste, of low flammability, not durable, very resistant to abrasion[11]. Used in making the staves of barrels and woodenware, it turns well. It makes an excellent fuel[99].

dwatta Anodyne Antinflammatory FebrifugeAlthough no specific mention has been seen for this species, the bark of most, if not all members of the genus contain salicin, a glycoside that probably decomposes into salicylic acid (aspirin) in the body[213, 238]. The bark is therefore anodyne, anti-inflammatory and febrifuge. It is used especially in treating rheumatism and fevers, and also to relieve the pain of menstrual cramps[238].

nrakta N. America. ksacta A group of naturally occurring hybrids between *P. nigra* and *P. deltoidea*[11].

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

nwatta A very easily grown plant, it does well in a heavy cold damp soil[1]. Prefers a deep rich well-drained circum-neutral soil, growing best in the south and east of Britain[11, 200]. Growth is much less on wet soils, on poor acid soils and on thin dry soils[11]. This species is fairly wind resistant, though it does not do well in exposed upland sites[11]. It dislikes shade and is intolerant of root or branch competition[200]. A very fast growing tree, it grows for a longer period in the season than other poplars. This hybrid species contains a number of named forms, several of which have been selected for their ornamental value[11, 200]. Many of them are fast growing trees that are used in forestry and for

shelterbelts[11, 200]. 'Serotina' and 'Robusta', in particular, are often used in shelter belt plantings. 'Serotina' is a male that responds well to pollarding but is slower in growth than some other cultivars[11]. 'Robusta' is a male and is frequently grown in forestry, as a screen and in shelterbelts[11]. The var. 'Regenerata' is tolerant of urban pollution[200]. Poplars have very extensive and aggressive root systems that can invade and damage drainage systems. Especially when grown on clay soils, they should not be planted within 12 metres of buildings since the root system can damage the building's foundations by drying out the soil[11]. Dioecious. Male and female plants must be grown if seed is required. Hybridizes freely with other members of this genus[200]. Special Features: Not North American native, Inconspicuous flowers or blooms.

5.2.649 Chamaecyparis obtusa

Japanese cypress

4 tlin 8 cyuc 0 kcaak 3 tcan 0 dwat 40 m hkuc htut cyutiI tcup hwicli hrasjlutnyik hpa7tli frusflatprikliwis hpa7tmwatli hjonli

drutta Chamaecyparis obtusa is an evergreen Tree growing to 40 m (131ft) by 25 m (82ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. The flowers are pollinated by Wind. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It cannot grow in the shade. It prefers moist soil. It cannot tolerate atmospheric pollution.

tcanta Agroforestry: Shade and shelter. A good pioneer species. General:Ornamental. Materials: Essential oils, Pesticide, Wood/timber. Wood Products: Sawn or hewn building timbers,Carpentry/joinery (exterior/interior), For light construction. Shingles, Wall panelling [1-7].

nrakta Native to central Japan and widely cultivated in the temperate northern hemisphere. ksacta Occurs where sympatric with *C. pisifera*, on wetter sites e.g. near mountain streams or in hollows with ground water near the surface. In those wet places trees can spread by the layering of branches to form small groves of clonal individuals. It is a minor constituent in mixed conifer/angiosperm forests. Its altitudinal range is from 280 m to 2600 m a.s.l. [1-7]

propta Seed - sow March/April in a seedbed outdoors[78]. The seed is best sown in pots in a frame[K]. Seed can take 18 months to germinate. One month warm then one month cold stratification has produced good results[113]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter, planting them out in late spring after the last expected frosts. Cuttings in late summer or autumn in sandy soil in a cold frame[1, 11, 200]. Difficult, it may be best done in late winter to early spring[113].

nwatta Prefers full sun on moist, well-drained soil, in areas of moderate to high humidity, and preferably where the trees can be protected from harsh winds. It is fairly free of pests and diseases. There are many cultivars, some quite dwarf. Other cultivars have excellent foliage coloration unusual for ground habit. Cultivars include:'Aurea' - golden foliage; 'Caespitosa' - rare, miniature, about six inches tall;'Compacta' - dwarf, about three feet tall,dense, conical;'Coralliformis' - branchlets reddish and contorted;'Crippsii' - broad pyramid with spreading branches and golden foliage;'Erecta' - columnar habit;'Ericoides' - low, blue-gray foliage;'Filicoides' -fern-like;'Gracilis' - compact growth habit, tips of branchlets pendulous;'Kosteri' - dwarf, three to four feet tall, branch tips curved;'Mariesii' - dwarf, foliage variegated with yellowish white;'Nana' - very dwarf, height and spread of two feet;'Pygmaea' - dwarf, two feet tall, wider than tall; 'Stoneham' - slow, dwarf, tiered branching;'Tetragona' - slow, dwarf, erect.

5.2.650 Chamaecyparis pisifera

Sawara cypress

4 tlin 8 cyuc 0 kcaak 3 tcan 0 dwat 40 m hkuc hmimhtut cyutiI hgattcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli hjonli

harvested in the autumn from cultivated plants that are 4 - 5 years old and are boiled before being sun-dried for later use[238, 250]. The roots of wild plants are harvested in the spring or (preferably) in the autumn and are sun-dried for later use[238]. The root is an ingredient of 'Four Things Soup', the most widely used woman's tonic in China[254]. The other species used are *Rehmannia glutinosa*, *Ligusticum wallichii* and *Angelica sinensis*[254]. A tea made from the dried crushed petals of various peony species has been used as a cough remedy, and as a treatment for haemorrhoids and varicose veins[250].

nrakta E. Asia - Siberia to Mongolia. ksacta Dry open stony slopes, riverbanks and sparse woodland edges[74]. Woods and grasslands at elevations of 400 - 2300 metres in China[266].

propta Seed - best sown as soon as it is ripe in a cold frame[250]. When sown fresh, the seed produces a root about 6 weeks after sowing with shoots formed in the spring[200]. Stored seed is much slower, it should be sown as soon as possible in a cold frame but may take 18 months or more to germinate[200]. The roots are very sensitive to disturbance, so many growers allow the seedlings to remain in their pots for 2 growing seasons before potting them up. This allows a better root system to develop that is more resilient to disturbance[250]. If following this practice, make sure you sow the seed thinly, and give regular liquid feeds in the growing season to ensure the plants are well fed. We usually prick out the seedlings into individual pots as soon as they are large enough to handle, and then grow them on in a cold frame for at least two growing seasons before planting them out when they are in growth in the spring[K]. Division with great care in spring or autumn. Each portion must have a leaf bud. If the lifted root is stood in shade for several hours it becomes less brittle and easier to divide[200]. Divisions that have several buds will usually flower in the second year, but those that only have one or two buds will take a number of years before they have grown sufficiently to flower[250].

nwatta Landscape Uses:Border, Foundation, Massing, Seashore, Specimen. An easily grown and undemanding plant[250], it does best in a deep rich soil, preferably neutral or slightly alkaline[1], doing quite well in sun or light shade[1, 200]. Plants are tolerant of a wide range of soil conditions, but will not survive if the soil becomes waterlogged or is too dry[250]. This species is lime tolerant[200]. Plants grown on sandy soils tend to produce more leaves and less flowers, whilst those growing on clay take longer to become established but produce better blooms[250]. Prefers a rich heavy soil that is well-drained but remains moist in the summer[187]. The species is hardy to about -25°C, but there are many named varieties some of which are hardy to about -50°[187]. Cultivated as a medicinal plant in China[178]. A very ornamental[1] and long-lived plant, surviving in gardens for 50 years or more[200]. Many hundreds of named varieties have been developed for their ornamental value[250]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54]. Strongly resents root disturbance, taking some time to recover if it is transplanted[1]. Plants should be planted with their crowns no more than 3cm below soil level. If planted deeper they do not flower so well[187]. Peony species are usually self-fertile, though they will also hybridise with other species if these flower nearby at the same time[250]. Plants take 4 - 5 years to flower from seed[200]. They generally breed true from seed[1]. Special Features:Attractive foliage, Naturalizing, Suitable for cut flowers, Suitable for dried flowers, Fragrant flowers.

5.2.646 Dianthus barbatus

Sweet William

4 tin 10 cyuc 1 kcaak 0 tcan 0 dwat 0.6 m hkuc htut cyutli kyuctucp hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Dianthus barbatus is a PERENNIAL growing to 0.6 m (2ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). It is noted for attracting wildlife.

Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: FlowersEdible Uses: The flowers have a mild flavour and are used as a garnish for vegetable and fruit salads, cakes, desserts, cold drinks etc[183].

nrakta S. Europe. An occasional garden escape in Britain[17]. ksacta Meadows and woods[45].

propta Seed - sow May/June in a cold frame. The seed usually germinates in 2 - 3 weeks. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer or autumn[1]. The seed can also be sown thinly in an outdoor seedbed in late spring, the young plants being planted out in late spring or the autumn. Cuttings of half-ripe shoots, July in a frame[1]. Division in September[1]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Landscape Uses:Border, Container, Rock garden, Seashore, Specimen. Prefers a rich well-drained loamy soil in a sunny position, but succeeds in most soils including dry ones[1]. A very ornamental plant[1], its flowers are very attractive to butterflies and moths[17, 30]. The flowers have a strong clove-like scent[245]. Plants self-sow freely when grown in a suitable position[1]. Although the Sweet William is a perennial species, it is quite short-lived and degenerates after its second year. It is best treated as a biennial in the garden[200]. Special Features:Attracts butterflies, Suitable for cut flowers, Suitable for dried flowers, Fragrant flowers.

5.2.647 Anthemis cotula

Mayweed, Stinking chamomile

4 tin 8 cyuc 1 kcaak 1 tcan 2 dwat 0.6 m hkuc htut cyutli kyuctucp hwicli jlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Anthemis cotula is an ANNUAL growing to 0.6 m (2ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies, beetles. The plant is self-fertile. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

pcista The whole plant is penetrated by an acrid juice, touching or ingesting the plant can cause allergies in some people[4, 222].

kcakta Edible Parts: LeavesEdible Uses: TeaThe herb is used as a flavouring in Peru[183]. It is aromatic. Caution is advised, there are some reports of toxicity. A herb tea is made from the flowers in a similar way to camomile tea[183] and it has a similar though weaker effect medicinally[4]. The odour is not very pleasant and so it is not commonly used[4].

tcanta Dye RepellentThe growing and the dried plant is said to repel mice and fleas[4, 20], it can also be used as an insecticide[21, 61, 100]. A gold dye is obtained from the whole plant[168, 169].

dwatta Antispasmodic Astringent Diaphoretic Diuretic Emetic Emmenagogue Epilepsy Stings TonicMayweed is closely related to camomile, but is far less effective as a medicine[254]. It has been used as an antispasmodic and to induce menstruation and was traditionally used to treat supposedly hysterical conditions related to the uterus[254]. It is rarely used in contemporary herbal medicine[254]. The whole plant is antispasmodic, astringent, diaphoretic, diuretic, emetic, emmenagogue and tonic[4, 61]. It is used internally as a tea, which can be made either from the flowers or the whole plant, though the flowers are less unpleasant and so are more commonly used[4]. An infusion is used in the treatment of a variety of complaints such as rheumatism, epilepsy, asthma, colds and fevers[257]. Applied externally, it is used as a poultice on piles or to draw splinters out of the body, and can also be applied to the bath water[4, 257]. The leaves are rubbed onto insect stings[222]. Some people are allergic to the plant and this remedy could give them painful blisters[240]. This herb is contraindicated for pregnant women or nursing mothers[254].

5.2.565 Sanguisorba tenuifolia

4 tin 8 cyuc 1 kcaak 0 tcan 0 dwat 1.2 m hkuc hmimhtut cyutli tucphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Sanguisorba tenuifolia is a PERENNIAL growing to 1.2 m (4ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: LeavesEdible Uses: Young leaves - cooked[105, 177].

nrakta E. Asia - China, Japan. ksacta Wet meadows and wet places along streams in lowland and mountain areas all over Japan[58].

propta Seed - sow spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the cold frame for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in the spring.

nwatta Succeeds in ordinary garden soil[1]. Prefers a good moist soil that does not dry out in the summer, in sun or partial shade[187, 200]. Hardy to about -25°C[187]. A polymorphic species[58].

5.2.566 Ribes fasciculatum

4 tin 8 cyuc 1 kcaak 0 tcan 0 dwat 1.5 m hkuc hmimhtut cyutli tucp hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Ribes fasciculatum is a deciduous Shrub growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf from March to November, in flower in April, and the seeds ripen from September to October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit - raw or cooked[177]. Unpalatable[1]. The reddish-brown fruit is about 5 - 10mm in diameter and contains a lot of fairly large seeds[266]. What little flesh there is remains unpleasant even in the autumn[K]. The fruit hangs well, probably because it is unpalatable[K]. Young leaves - cooked[105, 177].

nrakta E. Asia - China, Japan, Korea. ksacta Stony places near villages in Korea[151]. Forests and forest margins, bamboo woods, foothills, stony slopes and roadsides at elevations of 700 - 2400 metres in China[266].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. Stored seed requires 4 - 5 months cold stratification at between 0 to 9°C and should be sown as early in the year as possible[113, 164]. Under normal storage conditions the seed can remain viable for 17 years or more. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter, planting them out in late spring of the following year. Cuttings of half-ripe wood, 10 - 15cm with a heel, July/August in a frame[78, 113]. Cuttings of mature wood of the current year's growth, preferably with a heel of the previous year's growth, November to February in a cold frame or sheltered bed outdoors[78, 200].

nwatta Easily grown in a moisture retentive but well-drained loamy soil of at least moderate quality[11, 200]. Plants are quite tolerant of shade though do not fruit so well in such a position[11]. Hardy to about -20°C[200]. The flowers have a delicious aromatic perfume[245]. The fruit can hang on the plant until winter[182]. Plants can harbour a stage of white pine blister rust, so should not be grown in the vicinity of pine trees[155]. Plants in this genus are notably susceptible to honey fungus[200]. Female flowers appear to be perfect but the pollen in them and the ovules in

the male flowers are sterile[11]. Plants are therefore functionally dioecious, male and female plants must be grown if fruit and seed is required.

5.2.567 Conium maculatum

Hemlock, Poison hemlock

4 tin 8 cyuc 1 kcaak 0 tcan 2 dwat m hkuc hmimhtut cyutli tucp hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Conium maculatum is a BIENNIAL growing to 2 m (6ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista A very poisonous plant, the toxins are especially concentrated in the seed[1, 7, 10, 19, 62, 76]. The stems contain up to 0.06% of the toxic alkaloids, the leaves between 0.03 and 0.8%, the flowers from 0.09 to 0.24% and the green fruit from 0.73 to 0.98%[240]. The toxins, however, are very volatile and decompose readily[65], especially when the plant is dried or cooked[4]. The toxins paralyse the respiratory nerves, causing death by suffocation[238]. Children have been known to die after using the hollow stems as blowpipes[200]. The poisonous nature of the plant varies considerably, with many people believing that the plant is less toxic when grown in cooler climates[268].

kcakta Edible Parts: LeavesEdible Uses: Leaves - cooked[105]. Although toxic, plants found in the south of England are comparatively harmless and the leaves are used as a pot-herb[2]. They can also be dried for later use. The toxic principle is said to be destroyed by thorough cooking or drying[4, 100]. Caution is advised, especially on the remarks about plants in southern England[K]. See the notes above on toxicity.

dwatta Analgesic Antirheumatic Antispasmodic Cancer Emetic Epilepsy Galactofuge Homeopathy SedativeHemlock is a very poisonous plant that has a long history of medicinal use, though it is very rarely used in modern herbalism[238, 254]. It is a narcotic plant that sedates and relieves pain[238]. The plant contains coniine, an extremely toxic substance that can also cause congenital defects[254]. The whole plant is analgesic, antispasmodic, emetic, galactofuge and sedative[4, 7, 9, 21, 213, 222]. It is a traditional folk treatment for cancer[222] and was formerly widely used internally in very small doses to treat a variety of complaints including tumours, epilepsy, whooping cough, rabies and as an antidote to strychnine poisoning[232, 254]. It is still used externally, usually in ointments and oils, in the treatment of mastitis, malignant tumours (especially breast cancer) anal fissure and haemorrhoids[238]. The leaves and stems should be harvested when the first fruits are forming, since they are then at their most active medicinally[4]. The fruits are gathered either when fully ripe, or before they turn from green to yellow, and are then dried[4]. Because of the extremely toxic nature of this herb, it is seldom employed nowadays[232]. Use with extreme caution and only under the guidance of a qualified practitioner[21, 238]. See also the notes above on toxicity. A homeopathic remedy is prepared from a tincture of the fresh plant, harvested when in flower[232]. It is used for treating complaints such as dizziness, coughs, insomnia, exhaustion[232], arteriosclerosis and prostate problems[7].

nrakta Europe, including Britain, from Norway and Finland south and east to N. Africa and Iran. ksacta Waste ground and in damp places, avoiding acid soils and heavy shade[7].

propta Seed - best sown in situ as soon as it is ripe in the late summer. It usually germinates in the autumn.

nwatta A fairly common weed in Britain, it succeeds in most soils in sun or light shade and avoids acid soils in the wild. It prefers a damp rich soil[238]. This is the plant that Socrates is said to have used to kill himself, though this is probably an error[207]. It requires a large dose if it is to be lethal (this contradicts with the notes above on toxicity[K]), and death from this plant can be very painful whilst Socrates is said to have died without pain[207]. Another report says that poisonous doses cause paralysis, which starts

at the feet and moves up the body. There is no pain, the mind remains clear and lucid until death, which is caused by asphyxia when paralysis reaches the chest[232]. The whole plant has a foetid smell[7].

5.2.568 *Nemopanthus mucronatus*

Mountain Holly
4 tin 8 cyuc 1 kcaak 0 tcan 1 dwat m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli nyanhjen hjonli

drutta *Nemopanthus mucronatus* is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 5. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). . Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit[105, 161]. Quite bitter[257].

dwatta Diuretic TonicThe root is diuretic[257]. An infusion of the grated root is used in the treatment of gravel[257]. A decoction of the small branches, reduced to a syrup, has been used as a tonic[257].

nrakta Eastern N. America - Newfoundland to Ontario, south to Wisconsin, Indiana and Virginia. ksacta Damp woods, thickets and swamps[43].

propta Seed - best sown as soon as it is ripe in a cold frame. The seed can take 18 months to germinate. Stored seed generally requires two winters and a summer before it will germinate and should be sown as soon as possible in a cold frame. Scarification, followed by a warm stratification and then a cold stratification may speed up the germination time[78, 80]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of almost ripe wood with a heel, August in a shaded position in a cold frame. Leave for 12 months before potting up. Layering in October. Takes 2 years[78].

nwatta Tolerates most soils except those that are water-logged[200]. Prefers a cold damp spoil[1]. Seldom fruits well in Britain[11, 182], the seed only matures in reasonable summers[1]. Most of the plants that have been supplied under this name in Britain this century are in fact *lex collina*[200]. Dioecious, male and female plants must be grown if seed is required.

5.2.569 *Ageratina aromatica*

4 tin 8 cyuc 1 kcaak 0 tcan 1 dwat 1.5 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta *Ageratina aromatica* is a PERENNIAL growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 4. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: One report says that the root is aromatic and suggests that it could be edible[177].

dwatta Antispasmodic Diaphoretic Diuretic Expecto- rantThe plant is antispasmodic, diaphoretic, diuretic and expectorant[61]. It is used in the treatment of inflammation and irritability of the bladder[4], ague, pulmonary diseases, stomach complaints and nervous diseases[207].

nrakta Eastern N. America. ksacta Dry woods, thickets and clearings[43]

propta Seed - sow spring in a cold frame, only just covering the seed. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring.

nwatta Succeeds in an ordinary well-drained but mois- ture retentive garden soil in sun or part shade[200].

5.2.570 *Pycnanthemum flexuosum*

Mountain Mint, Appalachian mountainmint
4 tin 8 cyuc 1 kcaak 0 tcan 2 dwat 1 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Pycnanthemum flexuosum* is a PERENNIAL growing to 1 m (3ft 3in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta One report says that the plant is used for food, but gives no details[257].

dwatta Analgesic Diaphoretic Febrifuge StomachicThe leaves and flowering stems are popularly used in the treatment of bowel complaints[207]. A hot infusion of the plant is diaphoretic[207]. The plant is also used internally in the treatment of stomach upsets, fevers, colds and sinus headaches[238, 257]. A poultice of the leaves is used in the treatment of headaches[257]. A warm infusion of the plant has been used to bathe an inflamed penis[257]. The plant is harvested as it comes into flower and can be used fresh or dried.

nrakta Eastern N. America - Maine to Florida, New York, Minnesota, Kansas and Texas. ksacta Upland prairies, pastures, meadows, open woodland and roadsides[228].

propta Seed - sow spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. If there are sufficient seeds they can be sown in an outdoor seedbed in April. Division in spring.

nwatta Succeeds in most soils[1] but prefers a rich loamy soil in full sun or partial shade with plenty of moisture in the growing season[200]. Hardy to at least -15°C[200]. The correct name for this species should be *P. tenuifolium*. Schrad.[228]. The bruised leaves are very aromatic[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

5.2.571 *Pycnanthemum muticum*

Cluster Mountain Mint
4 tin 8 cyuc 1 kcaak 0 tcan 0 dwat m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Pycnanthemum muticum* is a PERENNIAL growing to 1 m (3ft 3in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Edible Uses: TeaThe leaves have a pleasant mint-like aroma and flavour and can be used to make a refreshing tea[183]. They can also be used as a mint substitute in cooking[238].

nrakta Eastern N. America - Maine to Virginia and Florida, west to Pennsylvania and Missouri. ksacta Sandy soils[235]. Dry open woods in Texas[274].

propta Seed - sow spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. If there are sufficient seeds they can be sown in an outdoor seedbed in April. Division in spring.

nwatta Succeeds in most soils[1] but prefers a rich loamy soil in full sun or partial shade with plenty of moisture

5.2.643 *Geranium incanum*

Geranium, Cranesbill
4 tin 9 cyuc 1 kcaak 0 tcan 0 dwat 0.4 m hkuc
htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Geranium incanum* is a PERENNIAL growing to 0.4 m (1ft 4in) by 0.6 m (2ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 9 and is not frost tender. It is in flower from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Edible Uses: TeaThe leaves are a tea substitute[183].

nrakta S. Africa. ksacta Scrub, dunes and forest clear- ings[187].

propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Landscape Uses:Border, Container, Ground cover, Massing, Rock garden. Succeeds in any moderately fertile retentive soil in a sunny position[200]. Tolerates a wide range of soil types[200]. Plants are not very hardy in Britain[200]. They tolerate occasional falls in temperature down to about -10°C, though if killed by cold they usually reappear from seed[187]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. The plant often adopts a climbing habit, sprawling through scrub[187]. Special Features:Attractive foliage, Fragrant foliage, Suitable for cut flowers, Extended bloom season in Zones 9A and above, Attractive flowers or blooms.

5.2.644 *Solidago virgaurea*

Goldenrod
4 tin 8 cyuc 1 kcaak 0 tcan 3 dwat 0.6 m hkuc
hmimhtut cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli flat- prikliwis hpa7tmwatli fyifxre7t hjonli

drutta *Solidago virgaurea* is a PERENNIAL growing to 0.6 m (2ft) by 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to October, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Mild allergic reactions. Avoid during pregnancy and breast feeding. Care if chronic kidney disease. Irrigation therapy is contraindicated in oedema cases [301].

kcakta Edible Parts: Edible Uses: TeaA tea is obtained from the leaves[46, 61, 183].

tcanta DyeMustard, orange and brown dyes can be obtained from the whole plant[168]. A yellow dye is obtained from the leaves and flowers[4, 100].

dwatta Anthelmintic Anticoagulant Antifungal Antin- flammatory Antirheumatic Antiseptic Aromatic Astringent Carminative Diaphoretic Diuretic Febrifuge Hypoglycaemic Stimulant TB UrinaryGoldenrod is a safe and gentle remedy for a number of disorders. In particular, it is a valuable as- tringent remedy treating wounds and bleeding, whilst it is particularly useful in the treatment of urinary tract disor- ders, being used both for serious ailments such as nephritis and for more common problems such as cystitis[254]. The plant contains saponins that are antifungal and act specifi- cally against the *Candida* fungus which is the cause of vaginal and oral thrush[238, 254]. It also contains rutin which is used to treat capillary fragility, and phenolic glycosides which are anti-inflammatory[238]. The leaves and flowering tops are anthelmintic, anti-inflammatory, antiseptic, aromatic, astrin- gent, carminative, diaphoretic, mildly diuretic, febrifuge and stimulant[4, 7, 9, 21, 147, 165]. A good vulnerary herb, it has

also proved of value when used internally in the treatment of urinary infections, chronic catarrh, skin diseases, influenza, whooping cough, bladder and kidney stones etc[4, 238]. Due to its mild action, goldenrod is used to treat gastro-enteritis in children[254]. It makes an excellent mouthwash in the treatment of thrush[7]. The plant is gathered in the summer and dried for later use[7]. The seed is antioagulant, astringent and carminative[218]. A homeopathic remedy is made from the plant[9]. It is used in the treatment of kidney and bladder disorders, rheumatism and arthritis[9]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve *Solidago virgaurea* for infection of the urinary tract, kidney and bladder stones (see [302] for critics of commission E).

nrakta Most of Europe, including Britain, temperate Asia and N. America. ksacta Dry woods, grassland, rocks, cliffs, hedgebanks, dunes etc on acid or calcareous soils[17].

propta Seed - sow spring in a cold frame. Only just cover the seed and do not allow the compost to become dry. Prick out the seedlings into individual pots when they are large enough to handle, and grow them on for their first winter in pots. Plant them out into their permanent positions in spring or early summer. Division in spring or autumn. Larger di- visions can be planted out direct into their permanent posi- tions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the sum- mer.

nwatta An easily grown plant, it succeeds in any moderately fertile moisture retentive soil in sun or semi- shade[200]. Grows well in heavy clay soils. A rather greedy plant, it is apt to impoverish the soil[1]. The bruised plant smells like wild carrots[4]. The sub-species *S. virgaurea min- uta* is only 10cm tall and wide[188]. The plant attracts vari- ous beneficial insects such as ladybirds, lacewings and hover- flies to the garden, these insects will help to control insect pests in the garden[201, 238].

5.2.645 *Paeonia lactiflora*

Chinese Peony, Peony
4 tin 10 cyuc 1 kcaak 0 tcan 3 dwat 0.8 m hkuc
hmimhtut cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli flat- prikliwis hpa7tmwatli fyifxre7t hjonli

drutta *Paeonia lactiflora* is a PERENNIAL growing to 0.8 m (2ft 7in) by 0.5 m (1ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in June, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Root Seed StemEdible Uses: Root - cooked and eaten in a broth[2, 4, 46, 183]. Stems - cooked[177]. Seed - powdered and mixed with tea[4, 183].

dwatta Alterative Analgesic Anodyne Antibacterial Anti-inflammatory Antiseptic Antispasmodic Astringent Carmi- native Diuretic Emmenagogue Expectorant Febrifuge Hypo- tensive Nervine Tonic Women's complaintsThe root of Chi- nese peony has been used for over 1,500 years in Chinese medicine. It is known most widely as one of the herbs used to make 'Four Things Soup', a woman's tonic, and it is also a remedy for gynaecological problems and for cramp, pain and giddiness[254]. When the whole root is harvested it is called Chi Shao Yao, if the bark is removed during prepara- tion then it is called Bai Shao Yao[250]. The root is alter- ative, analgesic, anodyne, antibacterial, anti-inflammatory, antiseptic, antispasmodic, astringent, carminative, diuretic, emmenagogue, expectorant, febrifuge, hypotensive, nervine and tonic[176, 218, 238, 279]. The most important ingredi- ent medicinally in the root is paeoniflorin, which has been shown to have a strong antispasmodic effect on mammalian intestines, it also reduces blood pressure, reduces body tem- perature caused by fever and protects against stress ul- cers[250]. It is taken internally in the treatment of men- strual disorders, injuries, high blood pressure, pre-menstrual tension and liver disorders[238]. It should only be used un- der the supervision of a qualified practitioner and should not be prescribed for pregnant women[238]. The roots are

from June to July, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Photosensitivity possible in light skinned people. Care needed as pimpinella contains essential oils and saponins [301].

kcakta Edible Parts: Leaves SeedEdible Uses: ConditionAn essential oil from the roots is used as a flavouring in candy, liqueurs etc[183].

dwatta Antispasmodic Astringent Carminative Cholagogue Diaphoretic Diuretic Emmenagogue Ophthalmic Resolvent Skin Stomachic UrinaryThe leaves are diaphoretic, diuretic, resolvent and stomachic[4]. The plant is harvested as it comes into flower and dried for later use[4]. The root is anti-inflammatory, mildly astringent and expectorant[9]. The fresh root is very hot and acrid, but this pungency is greatly reduced when the root is dried[4]. When chewed, the fresh root is effective in treating toothaches and paralysis of the tongue[4]. An effective diuretic, the root is used in treating disorders arising from obstructions of the viscera[4]. The root is also used for soothing coughs or the effects of laryngitis and bronchitis[9]. The roots can be harvested in the spring or autumn and are dried for later use[9]. The seeds are carminative[4]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Pimpinella major Greater Burnet Saxifrage for cough/bronchitis (see [302] for critics of commission E).

nrakta Europe, including Britain, from Scandinavia south and east to Portugal, the Balkans and Caucasus. ksacta Hedge banks, woodland edges and other grassy places[9].

propta The seed requires a period of cold stratification. If you can obtain fresh seed then it is best sown immediately. This can be done in situ if you have sufficient seed, but if you only have a small quantity then it is safer to sow it in pots in a cold frame. Sow stored seed as soon as you can obtain it, this is probably best done in a cold frame. When they are large enough to handle, prick the pot-grown seedlings out into individual pots and plant them out in the summer.

nwatta Easily grown in any good soil[1], preferring rather moist conditions[187]. Grows best in a cool position[233]. Plants are hardy to about -20°c[187].

5.2.640 Stachys hyssopifolia ambigua

hyssopleaf hedgenettle

4 tlin 8 cyuc 1 kcaok 0 tcan 1 dwat 0.8 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Stachys hyssopifolia ambigua is a PERENNIAL growing to 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 5. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Eaten as a vegetable[178]. No more details are given, it is likely to be the roots or the leaves that are eaten[K].

dwatta Astringent Carminative DeodorantThe plant is astringent, carminative and deodorant[178, 218].

nrakta E. Asia - Japan. Eastern N. America - Pennsylvania to Illinois, south to Florida. ksacta Damp sands, swamps and prairies[43].

propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring.

nwatta Succeeds in any deep well-drained moderately fertile soil in full sun or light shade[200]. A good bee plant[200].

5.2.641 Lycopus americanus

Water Horehound, American water horehound

4 tlin 8 cyuc 1 kcaok 0 tcan 3 dwat 0.5 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Lycopus americanus is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: RootEdible Uses: Root - raw or cooked[207]. This contradicts with the report in [200] that the plant does not form tubers on its rhizomes.

tcanta DyeThe juice gives a permanent colour to linen and wool and does not wash out[207]. The colour is not mentioned[K].

dwatta Astringent Narcotic SedativeThe whole plant is used as an astringent, hypoglycaemic, mild narcotic and mild sedative[4, 102, 222, 238]. It also slows and strengthens heart contractions[238]. The plant has been shown to be of value in the treatment of hyperthyroidism[222, 238], it is also used in the treatment of coughs, bleeding from the lungs and consumption, excessive menstruation etc[4, 238]. It should not be prescribed for pregnant women or patients with hypothyroidism[238]. The plant is harvested as flowering begins and can be use fresh or dried, in an infusion or as a tincture[4, 238].

nrakta N. America - Newfoundland to British Columbia, south to Florida, Texas, Utah and California. ksacta Low moist or wet places[222, 274].

propta Seed - sow spring or autumn in a cold frame[238]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse for their first year. Plant them out into their permanent positions in early summer. Division in spring or autumn[238]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Succeeds in damp meadows or in wet places by ponds or streams[200].

5.2.642 Arabis hirsuta

Hairy rockcress, Mountain rockcress, Creamflower rockcress

4 tlin 8 cyuc 1 kcaok 0 tcan 0 dwat 0.6 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Arabis hirsuta is a BIENNIAL/PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies), insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young leaves - cooked[177].

nrakta Most of Europe, including Britain, N. Africa and N. Asia to Japan. ksacta Chalk and limestone slopes, limestone rocks and walls, dunes and dry banks[177].

propta Seed - it is best to surface sow the seed as soon as it is ripe in a light position in a cold frame[134]. Seed can also be sown in spring. It usually germinates in 2 - 3 weeks at 21°c[134]. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division after flowering[111]. Very easy, the divisions can be planted out straight into their permanent positions if required. Cuttings in a shady border in summer[1].

nwatta Easily grown in ordinary well-drained soil. Succeeds in dry soils and on walls[K].

in the growing season[200]. Hardy to at least -15°c[200]. The bruised leaves are very aromatic[200].

5.2.572 Cimicifuga dahurica

Xing An Sheng Ma

4 tlin 8 cyuc 1 kcaok 0 tcan 3 dwat 1.5 m hkuc hmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Cimicifuga dahurica is a PERENNIAL growing to 1.5 m (5ft) by 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from August to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

pcista Although no specific mention of toxicity has been seen for this species, it does belong to a family that contains a number of toxic species and at least one species in this genus is said to be mildly poisonous. Some caution is therefore advised.

kcakta Edible Parts: LeavesEdible Uses: Young leaves - cooked[177]. Some caution is advised, see the notes above on toxicity.

dwatta Analgesic Antibacterial Antiviral Depurative Diaphoretic Diuretic Febrifuge Sedative TonicThis plant is an anti-infective herb that lowers fevers and reduces pain[238]. The root is analgesic, antibacterial, antiviral, depurative, diaphoretic, diuretic, febrifuge, sedative, tonic[46, 61, 147, 176, 218]. It is used internally in the treatment of coughs, colds, headaches, gum diseases and feverish infections such as measles[238]. The root is harvested in the autumn and used fresh or dried[238]. Use with caution[176], see the notes above on toxicity.

nrakta E. Asia - China, Japan, Mongolia, Siberia. ksacta Forest margins, shrub thickets, forests and very dry places in valley meadows[74].

propta Seed - best sown as soon as it is ripe in a cold frame[1]. Only just cover the seed. It germinates in 1 - 12 months or even longer at 15°c[164]. The seed does not store well and soon loses its viability[200], stored seed may germinate better if given 6 - 8 weeks warm stratification at 15°c and then 8 weeks cold stratification[164]. Prick out the young seedlings into individual pots when they are large enough to handle and grow them on in a frame for their first winter. Plant out in late spring or early summer[K]. Division in spring or autumn[1]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the summer or following spring.

nwatta Prefers a moist humus rich soil and some shade[1, 200]. Succeeds in ordinary garden soil[1]. Grows well in a cool moist site in a woodland[200]. The flowers have an unusual, slightly unpleasant smell[188]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

5.2.573 Verbena stricta

Hoary Vervain, Hoary verbena

4 tlin 8 cyuc 1 kcaok 0 tcan 1 dwat 1 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyfxre7t hjonli

drutta Verbena stricta is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Edible Uses: TeaA tea-like beverage has been made from the leaves[257].

dwatta Febrifuge StomachicThe plant is thought to be specific for fever and ague[207]. An infusion of the leaves has been used in the treatment of stomach aches[257].

nrakta Central N. America - Ontario and Ohio to South Dakota and Wyoming, south to Tennessee and Texas. ksacta Roadsides and other dry open places[60].

propta Seed - sow early spring in a greenhouse or cold frame[1]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring. Basal cuttings in early summer. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Succeeds in any moderately fertile well-drained but moisture retentive soil in a sunny position[1, 200]. Plants are hardy to about -20°c[187]. Plants are often short-lived and sometimes only annual[60]. Hybridizes with *V. hastata*[200].

5.2.574 Taraxacum megalorrhizon

4 tlin 8 cyuc 1 kcaok 0 tcan 0 dwat m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyfxre7t hjonli

drutta Taraxacum megalorrhizon is a PERENNIAL growing to 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Coffee TeaLeaves - raw or cooked. The following uses are also probably applicable to this species, though we have no records for them[K] Root - cooked[183]. Flowers - raw or cooked[183]. The unopened flower buds can be used in fritters[183]. The whole plant is dried and used as a tea[177, 183]. A pleasant tea is made from the flowers. The leaves and the roots can also be used to make tea. The root is dried and roasted to make a coffee substitute.

tcanta LatexA latex obtained from the roots is used to make a high-class rubber[61, 110].

nrakta S. Europe. ksacta Not known

propta Seed - sow spring in a cold frame and either surface-sow or only just cover the seed. Make sure the compost does not dry out. Germination should take place within 2 weeks. Prick out the seedlings into individual pots when they are large enough to handle, choosing relatively deep pots to accommodate the tap root. Plant them out in early summer. Division in early spring as the plant comes into growth.

nwatta Prefers a well-drained humus-rich soil in full sun or light shade. According to one report this species reproduces apomictically and sexually[50], whilst another report says that only apomictic seed production is undergone[110]. Apomixy is an asexual method of seed production where each seed is genetically identical to the parent plant. Occasionally seed is produced sexually, the resulting seedlings are somewhat different to the parent plants and if these plants are sufficiently distinct from the parents and then produce apomictic seedlings these seedlings are, in theory at least, a new species.

5.2.575 Festuca pratensis

Meadow fescue

4 tlin 10 cyuc 1 kcaak 3 tcan 0 dwat 1 m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyik hpa7tli frusflatprikwislip hpa7tmwatli hjonli

drutta Festuca pratensis is an evergreen Perennial growing to 1 m (3ft 3in) by 0.5 m (1ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. The flowers are pollinated by Wind. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and

basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. It cannot tolerate atmospheric pollution.

ksakta Possible edible seeds [1-4]

tcanta FodderF. pratensis has been valued for centuries as a pasture grass in temperate regions. It is more cold tolerant than *Festuca arundinacea*, although it is not as productive. Animal feed, fodder, forage. Environmental: Erosion control or dune stabilization. Genetic importance: Gene source. An ornamental grass [1-8]. Faunal Associations: Insects that feed on Fescue grasses (*Festuca* spp.) include caterpillars of the skipper *Atalopedes campestris* (Sachem), larvae of the moth *Pediasia tristecta* (Larger Sod Webworm), *Camnula pellucida* (Clear-winged Grasshopper), *Oulema melanopus* (Cereal Leaf Beetle), *Sphenophorus parvulus* (Bluegrass Billbug), *Blissus leucopterus hirtus* (Hairy Chinch Bug), *Metopolophium dirhodum* (Rose-Grass Aphid), *Rhopalosiphum oxycanthae* (Apple-Grass Aphid), *Tetraneura ulmi* (Elm and Grass Root Aphid), and other aphids. Horses, cattle, and other hoofed farm animals graze on the foliage of Meadow Fescue. The seeds of Meadow Fescue are eaten by the Greater Prairie Chicken. Meadow Fescue collapses into sprawling mats of vegetation during the winter, which probably provides good cover for voles and other small rodents [1-6].

nrakta Native to northern Europe east to Central Asia and south to Caucasus and Asia Minor. Introduced to North America from England (Reed, 1976). ksakta Meadows, roadsides, old pastures, and riversides on moist, rich soils, especially on loamy and heavy soils.

propta Slow to establish, this grass requires a clean seedbed. Propagated from sown at a rate of 11?28 kg/ha. Optimum temperature for germination, 20?30?C. In mixtures with clovers sown 9?13 kg/ha; with alfalfa, 3 kg/ha. Combines well with clovers, *Lotus corniculatus*, alfalfa and grasses, as *Phleum pratense* and *Dactylis glomerata*, producing a large proportion of leafy bottom growth (Reed, 1976).

nwatta A perennial grass growing 30-120cm high. It can be erect or spreading [1-4]. Ranging from Boreal Moist to Rain through Subtropical Dry Forest Life Zones, meadow fescue is reported to tolerate annual precipitation of 3.2 to 13.6 dm, annual temperature of 4.3 to 21.1?C, and pH of 4.5 to 8.2 (Duke, 1978, 1979). Adapted to cool climates as a cool-season turfgrass. Thrives in deep rich soil, but also grows well on calcareous or sandy soils provided they are moist. In native areas, found in meadows, forest margins, thin forests (Reed, 1976). In Pakistan it grows at about 2,000 m altitude. In Sichuan and Yunnan [1-4]. Flowering from June until August in the Northern Hemisphere. US Forest Service (2016) records that it is tolerant of acid soils but may also occur in calcareous soils. Although it survives regular mowing, this grass prefers unmowed or little-mowed areas [1-6].

5.2.576 Berberis sieboldii

4 tlin 8 cyuc 1 kcaak 0 tcan 2 dwat 1 m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta *Berberis sieboldii* is a deciduous Shrub growing to 1 m (3ft 3in). See above for USDA hardness. It is hardy to UK zone 5. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

ksakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177].

tcanta DyeA yellow dye is obtained from the root.

dwatta Antibacterial Cancer DysenteryBerberine, universally present in rhizomes of *Berberis* species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with *Glycyrrhiza* species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta E. Asia - C. Japan. ksakta Not known

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78]. Suckers, removed in late autumn/early winter and planted out in situ or potted up and planted out in late spring[200].

nwatta Prefers a warm moist loamy soil but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 182, 200]. Grows well in heavy clay soils. Prefers a lime-free soil[82]. Prefers a dry sunny position[11]. A very ornamental plant[1], it is closely related to *B. vulgaris*[200]. This species is probably an alternate host of 'black-stem rust' of wheat and is best not cultivated in cereal growing areas[K]. Hybridizes freely with other members of this genus[1]. Plants produce suckers freely, forming thickets[182]. They can be pruned back quite severely and will resprout well from the base[200].

5.2.577 Euonymus hamiltonianus maackii

4 tlin 8 cyuc 1 kcaak 0 tcan 0 dwat m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Euonymus hamiltonianus maackii* is a deciduous Shrub growing to 6 m (19ft 8in). See above for USDA hardness. It is hardy to UK zone 4. It is in flower in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Although no records of toxicity have been seen for this species, a number of plants in this genus are suspected of being poisonous and so some caution is advised.

ksakta Edible Parts: LeavesEdible Uses: Young leaves - boiled[105, 177].This report should be treated with some caution since many members of this genus are poisonous.

tcanta LatexRoots yield up to 6% gutta-percha, a non-elastic rubber used as an electrical insulator and in making plastics etc[74].

nrakta E. Asia - N. China, Korea. ksakta Shrubby formations in river valleys, coastal plains etc, usually on alluvial sands, occasionally on dry ridges with open forest[74].

propta Seed - best sown as soon as it is ripe in a cold frame[113]. Stored seed requires 3 months cold stratification so should be sown as early in the year as possible in a cold frame[113]. The seed can take 18 months to germinate[74]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, taken at a node, July/August in a frame. Very easy[200]. Root cuttings in winter[113].

nwatta Thriving in almost any soil, including chalk, it is particularly suited to dry shaded areas[200]. Prefers a well-drained loamy soil[1]. Cultivated for its latex in Russia, producing most when grown in open arid habitats[74].

5.2.578 Mertensia paniculata

Tall bluebells, Alaska tall bluebells, Northern bluebells, East-wood's bluebells

4 tlin 8 cyuc 1 kcaak 0 tcan 0 dwat 0.8 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

ksakta Edible Parts: FruitEdible Uses: Fruit[105, 177]. No more details are given.

dwatta MiscellanyThe root contains steroidal saponins, which have hormonal effects on the body[222, 238]. They are being used in gynaecological and obstetric medicine[238].

nrakta E. Asia - Japan, Korea. ksakta Mountains in C. and S. Japan[58]. Shady places in rocky wooded ravines in humus-rich soils[42, 90, 200].

propta Seed - best sown in a shaded cold frame as soon as it is ripe[134, 200]. Stored seed should be sown in late winter or early spring. Seed usually germinates within 1 - 3 months at 15°C. Another report says that seeds produce a root after the first cold stratification but no shoot is produced until after a second winter[138], whilst yet another report says that the seed can take 3 years to germinate[238]. The seedlings are prone to damp off and must therefore be watered with care and given plenty of fresh air[138]. The young plants need to be overwintered in a cold frame for the first year and can then be planted out in late spring. It is very important that the pots become neither too dry nor too wet[138]. Division with care when the plants die down after flowering[200]. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the following spring.

nwatta Prefers a deep well-drained woodland or humus-rich soil in a somewhat shady position that remains moist in the summer[1, 42]. Prefers a neutral to slightly acid soil[200]. Grows well in open woodland[1]. Succeeds in deep shade[188]. Succeeds in a sunny position if the soil does not dry out[42]. This species is closely related to *T. kantschiaticum*[200]. Any transplanting is best done whilst the plants are in flower[200]. Plants can flower in two years from seed[138]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233], though slugs are very fond of the leaves[238].

5.2.637 Trillium ovatum

Wakerobin, Pacific trillium, Oettinger's trillium, Hibberson's trillium

4 tlin 8 cyuc 1 kcaak 0 tcan 1 dwat 0.4 m hkuc pcmhminhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Trillium ovatum* is a PERENNIAL growing to 0.4 m (1ft 4in) by 0.2 m (0ft 8in). See above for USDA hardness. It is hardy to UK zone 5. It is in flower from May to June. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

ksakta Edible Parts: LeavesEdible Uses: The leaves are sometimes cooked for greens[212].

dwatta Birthing aid Ophthalmic SkinA decoction of the fresh or dried powdered root is used as a treatment for sore eyes[207]. The fresh root juice can be dripped into an afflicted eye[257]. The juice of the plant can be applied externally as a treatment for boils[257]. A poultice of the root can be used as a treatment for boils[257]. The thick underground root stalks were used by some native North American Indian tribes during childbirth[212].

nrakta Western N. America - Montana to British Columbia, south to California and Colorado. ksakta Rich woodlands[165]. Damp woods or boggy areas in partial shade, from low valleys to elevations of 2,000 metres[212].

propta Seed - best sown in a shaded cold frame as soon as it is ripe[134, 200]. Stored seed should be sown in late winter or early spring. Seed usually germinates within 1 - 3 months at 15°C. Another report says that seeds produce a root after the first cold stratification but no shoot is produced until after a second winter[138], whilst yet another report says that the seed can take 3 years to germinate[238]. The seedlings are prone to damp off and must therefore be watered with care and given plenty of fresh air[138]. The young plants need to be overwintered in a cold frame for the first year and can then be planted out in late spring. It is very important that the pots become neither too dry nor too wet[138]. Division with care when the plants die down after

flowering[200]. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the following spring.

nwatta Prefers a deep well-drained woodland or humus-rich soil in a somewhat shady position that remains moist in the summer[1, 42]. Prefers a neutral to slightly acid soil[200]. Grows well in open woodland[1]. Succeeds in deep shade[188]. Succeeds in a sunny position if the soil does not dry out[42]. Any transplanting is best done whilst the plants are in flower[200]. Plants can flower in two years from seed[138]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233], though slugs are very fond of the leaves[238].

5.2.638 Pulmonaria saccharata

Jerusalem Sage, Bethlehem lungwort, Lungwort

4 tlin 8 cyuc 1 kcaak 0 tcan 0 dwat 0.3 m hkuc pcmhminhtut cyutli hgattcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Pulmonaria saccharata* is an evergreen Perennial growing to 0.3 m (1ft) by 0.6 m (2ft in) at a slow rate. See above for USDA hardness. It is hardy to UK zone 3 and is not frost tender. It is in leaf all year, in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought.

ksakta Edible Parts: Edible Uses: CondimentThe plant is said to be used as a spice[177, 183]. No more details are given.

tcanta A good ground cover plant for a shady position[188, 197]. Plants should be spaced about 60cm apart each way[208].

nrakta Central and southern Europe. ksakta Woods and scrub[187]. Shaded positions in deep humus-rich soils[200].

propta Seed - sow spring in a greenhouse. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring or autumn or after flowering in early summer if the soil is not too dry[200]. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Landscape Uses:Border, Container, Ground cover, Massing, Specimen, Woodland garden. Grows well in any moderately good soil including heavy clay soils[1, 31]. Prefers full to part shade in a moist humus rich soil[200]. Succeeds in the sunless shade of buildings[200]. Dislikes dry soils[200]. Plants growing in shady positions tolerate drought if the soil is rich in humus[190]. The leaves tend to wilt in hot weather when the plant is grown in full sun[190]. Hardy to about -20°C[187]. A very ornamental plant[233], it is semi-evergreen, forming small overwintering rosettes[200]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. A valuable early nectar source for bees[200]. Plants seen growing in dappled shade at Hilliers Arboretum in April 1999 were self-sowing quite freely[K]. Hybridizes freely with other members of this genus[200]. There are many named varieties, selected for their ornamental value[200]. Special Features: Attractive foliage.

5.2.639 Pimpinella saxifraga

Greater Burnet Saxifrage, Hollowstem burnet saxifrage

4 tlin 8 cyuc 1 kcaak 0 tcan 2 dwat 0.8 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta *Pimpinella saxifraga* is a PERENNIAL growing to 0.8 m (2ft 7in) by 0.3 m (1ft). See above for USDA hardness. It is hardy to UK zone 5 and is not frost tender. It is in flower

4 tlin 9 cyuc 1 kcaak 0 tcan 1 dwat 0.8 m hkuac
htut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatprik-
wis hpa7tmwatli xre7t hjonli

drutta Ratibida columnifera is a PERENNIAL growing to 0.8 m (2ft 7in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: Edible Uses: TeaA pleasant tasting tea is made from the leaves and flower heads[161, 177, 183, 257].

dwatta Analgesic FebrifugeThe leaves and stems are analgesic[257]. An infusion is used to relieve the pain of headaches and to treat stomach aches and fevers[257]. A decoction is used as a wash to relieve pain and to treat poison ivy rash[257]. The decoction is also used as a wash to draw the poison out of a rattlesnakes bite[257].

nrakta Western N. America - British Columbia to Montana, Nebraska, Texas, New Mexico and Mexico. ksacta Dry plains, prairies and ravines[43]. Sandy, silty, or rocky open ground in Texas[274].

propta Seed - we have no information for this species but suggest sowing the seed in a cold frame in early spring. Only just cover the seed and put the pot in a sunny position. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in early summer. Division in spring is possible but very difficult because the plant has a long taproot[200].

nwatta Landscape Uses:Border. Prefers a sunny well-drained border of fairly rich soil[1]. Established plants are extremely drought tolerant[200]. A very ornamental plant[1]. Although perennial, plants are sometimes grown as annuals, they flower in their first year from seed[200]. Special Features:North American native, Naturalizing, Suitable for cut flowers.

5.2.634 Linaria vulgaris

Yellow Toadflax, Butter and eggs

4 tlin 8 cyuc 1 kcaak 3 tcan 2 dwat 0.6 m hkuac
hnmimhtut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flat-
prikliwis hpa7tmwatli xre7t hjonli

drutta Linaria vulgaris is a PERENNIAL growing to 0.6 m (2ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from July to October, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

pcista One report suggests that the plant might be slightly toxic[76].

kcakta Edible Parts: LeavesEdible Uses: Young shoots - cooked[7]. Use with caution, see the notes above on toxicity.

tcanta Dye InsecticideA yellow dye is obtained from the whole plant[7, 13]. It is obtained from the flowers according to other reports[4, 100]. A tea made from the plant has been used as an insecticide[222]. A good bee plant[24]. Dynamic accumulator.

dwatta Antiphlogistic Astringent Cathartic Detergent Diuretic Hepatic Homeopathy Ophthalmic PurgativeYellow toadflax has a long history of herbal use. It acts mainly on the liver and was once widely employed as a diuretic in the treatment of oedema[238]. It is little used now, but undoubtedly merits investigation[238]. The whole plant is antiphlogistic, astringent, cathartic, detergent, depurative, diuretic, hepatic, ophthalmic and purgative[4, 7, 9, 21]. It is gathered when just coming into flower and can be used fresh or dried[4, 238]. The plant is especially valued for its strongly laxative and diuretic activities[4]. It is employed internally in the treatment of oedema, jaundice, liver diseases, gall bladder complaints and skin problems[4, 222, 238]. Externally it is applied to haemorrhoids, skin eruptions, sores and malignant ulcers[238]. The plant should be used with caution.

It should preferably only be prescribed by a qualified practitioner and should not be given to pregnant women[238]. Dosage is critical, the plant might be slightly toxic[21, 238]. The fresh plant, or an ointment made from the flowers, is applied to piles, skin eruptions etc[4, 222]. The juice of the plant, or the distilled water, is a good remedy for inflamed eyes and cleaning ulcerous sores[4]. A homeopathic remedy is made from the plant[9]. It is used in the treatment of diarrhoea and cystitis[9].

nrakta Europe, including Britain, from Norway south and east to the Pyrenees, Greece and W. Asia. ksacta Hedgerows, by ditches, on dry banks and roadside verges. It is especially abundant in sandy and gravelly soils, and in chalk and limestone districts, and avoids acid soils[4, 7].

propta Seed - sow early spring in situ. Division in April or the autumn. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring. This species can be divided successfully at almost any time in the growing season.

nwatta Succeeds in a moderately good well-drained soil[1]. Grows best in a neutral to alkaline soil[238]. It prefers a sunny position[111] but also succeeds in semi-shade[219]. A very drought resistant plant once established[200], it can be grown in a drystone wall[219]. Plants can spread fairly aggressively at the roots when they are in a suitable position[K]. They also often self-sow freely[238].

5.2.635 Disporum sessile

Japanese Fairy Bells

4 tlin 8 cyuc 1 kcaak 0 tcan 0 dwat 0.6 m hkuac
hmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis
hpa7tmwatli xre7t hjonli

drutta Disporum sessile is a PERENNIAL growing to 0.6 m (2ft) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from April to May. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young leaves - cooked[105, 177].

nrakta E. Asia - Japan. ksacta Woods in hilly country and foothills all over Japan[58].

propta Seed - best sown in a cold frame as soon as it is ripe[175]. Use a lime-free compost and keep it moist[175]. Stored seed requires 6 weeks cold stratification and should be sown as early in the year as possible[175]. Germination usually takes place within 3 - 6 months or more at 15°C[175]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring[200].

nwatta Landscape Uses:Border, Woodland garden. Best grown in partial shade in a moist peaty or woodland soil[1, 175]. Plants spread rapidly[188] by means of creeping rhizomes when they are grown in a leafy soil[187]. This species is very closely related to Disporum nantouense, and both species could be identical[266]. Special Features:Attractive foliage.

5.2.636 Trillium tschonoskii

4 tlin 8 cyuc 1 kcaak 0 tcan 2 dwat 0.2 m hkuac
pcimhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flat-
prikliwis hpa7tmwatli xre7t hjonli

drutta Trillium tschonoskii is a PERENNIAL growing to 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

drutta Mertensia paniculata is a PERENNIAL growing to 0.8 m (2ft 7in) by 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in July. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: Flowers LeavesEdible Uses: Flowers - raw[172]. Leaves - raw or cooked[172]. The leaves are rather hairy and are not so nice when eaten raw[172].

nrakta Western N. America - Hudson Bay to Alaska, South to Michigan, Nebraska, Idaho and Washington. ksacta Woods, moist meadows, damp thickets, wet cliffs, riverbanks, dry slopes and burn areas from the foothills to high elevations in the mountains[60, 172].

propta Seed - best sown in a cold frame as soon as it is ripe[1, 200]. Sow stored seed as early in the year as possible. Protect from direct sunlight[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division, with care, in early spring or autumn[200].

nwatta Easily grown in an ordinary garden soil with some shade[1, 111]. Prefers a deep moist but well-drained humus-rich soil in sun or semi-shade[200]. If the plant is cut down after flowering, it will normally produce another flush of flowers[233]. A very ornamental plant[233], it grows well in open woodland[200].

5.2.579 Sedum acre

Common Stonecrop, Goldmoss stonecrop, Gold Moss Sedum
4 tlin 9 cyuc 1 kcaak 0 tcan 2 dwat 0.1 m hkuac
htut cyutli hgatkyuctcup hwicli hyshrasjlutnyik hpa7tli flat-
prikliwis hpa7tmwatli fyfixre7t hjonli

drutta Sedum acre is an evergreen Perennial growing to 0.1 m (0ft 4in) by 0.3 m (1ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf all year, in flower from June to July, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

pcista Poisonous[19]? The sap can irritate the skin of some people[76]. Other reports suggest that no members of this genus are poisonous[62, 85]. The flowers are yellow which suggests that in quantity the leaves can cause stomach upsets.

kcakta Edible Parts: LeavesEdible Uses: CondimentLeaves - raw or cooked[13, 100]. Rich in vitamin C, but it has a bitter acrid taste[1, 244]. The main interest in the edible qualities of this plant is as a survival food, since it grows wild in the driest deserts as well as in arctic conditions[244]. Large quantities can cause stomach upsets[19]. It is best to dry the leaves (which can be difficult because they are very fleshy) and then powder them and use them to add a peppery taste to foods[244]. The leaves are dried and ground into a powder to make a spicy seasoning[183].

tcanta The plant spreads aggressively and can be used for ground cover in a sunny position amongst plants tall enough not to be overrun by it. Many species of the stronger-growing bulbs such as lilies can grow successfully through it[K].

dwatta Astringent Foot care Hypotensive Laxative Rubefacient Vermifuge Vitamin C VulneraryThe herb is astringent, hypotensive, laxative, rubefacient, vermifuge and vulnerary[4, 7, 9, 13, 46]. It is considered to be a useful medicinal plant by some herbalists, though others do not use it because of the violence of its operation when taken internally[4, 7]. One of its best uses is as an effective and harmless corn-remover, it can also be used to bring boils to a head, though this can also cause some local irritation[7]. The bruised fresh plant is applied as a poultice to wounds and minor burns[9],

though some care should be exercised because the plant can cause blisters or skin irritations[244]. The herb is difficult to dry and so is best used when fresh, it can be gathered at any time during the spring and summer[7]. A homeopathic remedy is made from the plant[9]. It is used in the treatment of piles and anal irritations[9].

nrakta E. Europe - Balkans. Long naturalized in Britain[17]. ksacta Dry sunny situations on rocks, roofs, walls etc, especially near the sea[4, 7, 19]. Often found on limestone hills, it avoids acid soils[17].

propta Seed - surface sow in spring in well-drained soil in a sunny position in a greenhouse. Do not allow the soil to dry out. It can also be sown in the autumn in a cold frame, some seed germinates immediately whilst others germinate in the spring. Prick out the seedlings into individual pots when they are large enough to handle. If sufficient growth is made, it is possible to plant them out during the summer, otherwise keep them in a cold-frame or greenhouse for their first winter and plant them out in early summer of the following year[K]. Division is very easy and can be carried out at almost any time in the growing season, though is probably best done in spring or early summer. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Landscape Uses:Container, Ground cover, Rock garden, Seashore, Specimen. A very easily grown plant, it succeeds in most soils[188] but prefers a sunny position in a fertile well-drained soil[200]. Established plants are drought tolerant[190]. Grows well on walls[190]. Plants can be very aggressive and invasive, spreading freely at the roots[200]. If clearing the plant from an area it is quite important to try and remove every part of the plant since even a small part of the stem, if left in the ground, can form roots and develop into a new plant[200]. All members of this genus are said to have edible leaves, though those species, such as this one, that have yellow flowers can cause stomach upsets if they are eaten in quantity[62, 85]. Plants in this genus seem to be immune to the predations of rabbits[233]. Special Features: Attractive foliage, Not North American native, Invasive, Naturalizing.

5.2.580 Paeonia anomala

Anomalous peony, Common Peony

4 tlin 8 cyuc 1 kcaak 0 tcan 3 dwat 0.5 m hkuac
hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikli-
wis hpa7tmwatli fyfixre7t hjonli

drutta Paeonia anomala is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves RootEdible Uses: Root - dried and cooked with protein foods[74, 250]. Young shoots - cooked[177].

dwatta Antispasmodic Antitussive Astringent Febrifuge Hypotensive StomachicThe root is astringent and stomachic[61]. The Chinese herb Chi Shao Yao is made from the whole root of a number of peony species, especially *P. lactiflora*, but also occasionally this species[250]. The most important ingredient medicinally in the root is paeoniflorin, which has been shown to have a strong antispasmodic effect on mammalian intestines, it also reduces blood pressure, reduces body temperature caused by fever and protects against stress ulcers[250]. A tea made from the dried crushed petals of various peony species has been used as a cough remedy, and as a treatment for haemorrhoids and varicose veins[250].

nrakta Europe to C. Asia. ksacta Coniferous woods, rocky hillsides amongst shrubs and in dry steppe grassland[187]. Forest margins and clearings[74].

propta Seed - best sown as soon as it is ripe in a cold frame[250]. When sown fresh, the seed produces a root about 6 weeks after sowing with shoots formed in the spring[200]. Stored seed is much slower, it should be sown

as soon as possible in a cold frame but may take 18 months or more to germinate[200]. The roots are very sensitive to disturbance, so many growers allow the seedlings to remain in their pots for 2 growing seasons before potting them up. This allows a better root system to develop that is more resilient to disturbance[250]. If following this practice, make sure you sow the seed thinly, and give regular liquid feeds in the growing season to ensure the plants are well fed. We usually prick out the seedlings into individual pots as soon as they are large enough to handle, and then grow them on in a cold frame for at least two growing seasons before planting them out when they are in growth in the spring[K]. Division with great care in spring or autumn. Each portion must have a leaf bud. If the lifted root is stood in shade for several hours it becomes less brittle and easier to divide[200]. Divisions that have several buds will usually flower in the second year, but those that only have one or two buds will take a number of years before they have grown sufficiently to flower[250].

nwatta An easily grown plant, it does best in a deep rich soil, preferably neutral or slightly alkaline[1], doing quite well in sun or light shade[1, 200]. Plants are tolerant of a wide range of soil conditions, but will not survive if the soil becomes waterlogged or is too dry[250]. This species is lime tolerant[200]. Plants grown on sandy soils tend to produce more leaves and less flowers, whilst those growing on clay take longer to become established but produce better blooms[250]. Very cold resistant[74], tolerating temperatures down to at least -25°C[187]. A very ornamental[74] and long-lived plant, specimens can survive in the garden for at least 50 years[200]. This species is closely related to *P. veitchii*, differing mainly in only having one flower to a stem[250]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. A very greedy plant inhibiting the growth of nearby plants, especially legumes[54]. Strongly resents root disturbance, taking some time to recover after being divided[1]. Peony species are usually self-fertile, though they will also hybridise with other species if these flower nearby at the same time[250]. Plants take 4 - 5 years to flower from seed[200]. They generally breed true from seed[1].

5.2.581 *Verbena officinalis*

Vervain, Herb of the cross, Prostrate verbena
4 tin 8 cyuc 1 kcaak 0 tcan 3 dwat 0.6 m hkuc
htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyixre7t hjonli

drutta *Verbena officinalis* is a PERENNIAL growing to 0.6 m (2ft) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from April to October, in flower from July to September, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

pcista High doses of verbenalin can cause nervous system paralysis resulting in stupor and convulsion. Allopathic medicine for high blood pressure can be effected by vervain. Uterus stimulation possible - avoid during pregnancy. Avoid if breast feeding. If allergies or fits use with caution[301].

kcakta Edible Parts: Flowers LeavesEdible Uses: TeaLeaves - parboiled, seasoned and then eaten[183]. The leaves are used as a tea substitute[7, 183]. The flowers are used as a garnish[183].

dwatta Analgesic Antibacterial Anticoagulant Antipruritic Antirheumatic Antispasmodic Antitumor Astringent Bach Birthing aid Depurative Diaphoretic Diuretic Dysentery Eczema Emmenagogue Galactagogue Stimulant Tonic VulneraryVervain, which has tonic and restorative properties, is sometimes used as a domestic herbal remedy. It is useful when taken internally in the treatment of headaches, fevers, nervous exhaustion, depression, gall bladder problems, insufficient lactation etc[4, 238]. It should not be given to pregnant women, though it can be used to assist contractions during labour[238]. Externally, it is used to treat minor injuries, eczema, sores, neuralgia and gum disease[238].

The leaves and flowering stems are analgesic, antibacterial, anticoagulant, antispasmodic, astringent, depurative, diaphoretic, mildly diuretic, emmenagogue, galactagogue, stimulant, tonic and vulnerary[4, 9, 21, 147, 165, 176, 218, 238]. The plant is harvested as flowering begins in the summer and dried for later use[7, 238]. Some remarkable results have been obtained when using this plant in the treatment of certain tumours, but further research needs to be carried out before definite claims can be made[7]. The root is astringent, it is used in the treatment of dysentery[218]. This species was ranked 12th in a Chinese survey of 250 potential antifertility plants[218]. The plant is used in Bach flower remedies - the keywords for prescribing it are 'Strain', 'Stress', 'Tension' and 'Over-enthusiasm'[209].

nrakta Europe, including Britain, from Denmark south and east to N. Africa, W. Asia to the Himalayas. ksacta Waste ground and roadsides, avoiding acid soils and shady positions[4, 7, 17].

propta Seed - sow early spring in a greenhouse and only just cover the seed. Germination should take place within 3 weeks. Prick out the seedlings into individual pots once they are large enough to handle and plant them out in early summer. If you have sufficient seed, it can also be sown in situ in late spring. Division in spring. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring. Basal cuttings in early summer. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta A very easily grown plant, it succeeds in any moderately fertile well-drained but moisture retentive soil in a sunny position[1, 200]. Plants are very tolerant of neglect and will maintain themselves for a number of years even when growing in dense weed competition[K]. Self-sows freely when growing in a suitable position[K]. The growing plant attracts butterflies and moths[30].

5.2.582 *Sedum telephium*

Orpine
4 tin 8 cyuc 1 kcaak 0 tcan 2 dwat 0.5 m hkuc
pcimhmimhtut cyutli hgatkyuctup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyixre7t hjonli

drutta *Sedum telephium* is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: Leaves RootEdible Uses: Leaves - raw or cooked[2, 12, 55, 66, 115, 183]. They have occasionally been used in salads[4]. Root - cooked. Used in soups, stews etc[12].

dwatta Astringent Cytostatic SkinTeaThe whole plant is astringent and cytostatic[4, 66]. It is a popular remedy for diarrhoea, stimulates the kidneys and has a reputation in the treatment of cancer[4]. A poultice of the crushed leaves has been used in the treatment of boils and carbuncles[257]. nrakta Europe, incl Britain, south and east from Scandinavia to the Pyrenees, temperate Asia, N. America. ksacta Hedge banks and the shady sides of damp woods[1, 4, 67].

propta Seed - surface sow in spring in well-drained soil in a sunny position in a greenhouse. Do not allow the soil to dry out. Prick out the seedlings into individual pots when they are large enough to handle. If sufficient growth is made, it is possible to plant them out during the summer, otherwise keep them in a cold-frame or greenhouse for their first winter and plant them out in early summer of the following year[K]. Division is very easy and can be carried out at almost any time in the growing season, though is probably best done in spring or early summer. Larger divisions can be planted out

5.2.630 *Spiraea betulifolia aemiliana*

4 tin 8 cyuc 1 kcaak 0 tcan 0 dwat 0.3 m hkuc
htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Spiraea betulifolia aemiliana* is a deciduous Shrub growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Edible Uses: TeaThe leaves are a tea substitute[177, 183].

nrakta E. Asia - Japan. ksacta High mountains, N. Japan[58].

propta Seed - we have no information for this species but suggest sowing the seed as soon as it is ripe in a cold frame if possible. It is likely to require stratification before it germinates, so stored seed should be sown in a cold frame as early in the year as you receive it. Prick out the seedlings into individual pots when they are large enough to handle, and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a light sandy soil a frame. Cuttings of mature wood of the current seasons growth, 15cm long, October/November in an outdoor frame[200]. Another report says that September is a good time to do this[11]. Division of suckers in early spring[200]. They can be planted out straight into their permanent positions.

nwatta Tolerates most soils[200], but prefers a good loamy soil, abundant moisture and full sunlight[11, 200]. Hybridizes freely with other members of this genus[11].

5.2.631 *Gentiana scabra buergeri*

4 tin 8 cyuc 1 kcaak 0 tcan 3 dwat 0.5 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Gentiana scabra buergeri* is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bumblebees, butterflies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young plant and old leaves - cooked[105]. A famine food, used when all else fails[177, 179].

dwatta Anodyne Anthelmintic Antiinflammatory Antiseptic Bitter Chologogue Eczema Emmenagogue Expecto-rant Febrifuge Pectoral Refrigerant Stomachic Tonic UrinaryThe root is antibacterial and stomachic[176]. It is used in the treatment of jaundice, leucorrhoea, eczema, conjunctivitis, sore throat, acute infection of the urinary system, hypertension with dizziness and tinnitus[176]. The root is harvested in the autumn and dried for later use. This species is one of several that are the source of the medicinal gentian root[4], the following notes are based on the general uses of *G. lutea* which is the most commonly used species in the West[K]. Gentian root has a long history of use as a herbal bitter in the treatment of digestive disorders and is an ingredient of many proprietary medicines. It contains some of the most bitter compounds known and is used as a scientific basis for measuring bitterness[238]. It is especially useful in states of exhaustion from chronic disease and in all cases of debility, weakness of the digestive system and lack of appetite[4]. It is one of the best strengtheners of the human system, stimulating the liver, gall bladder and digestive system[238], and is an excellent tonic to combine with a purgative in order to prevent its debilitating effects[4]. The root is anthelmintic, anti-inflammatory, antiseptic, bitter tonic, chologogue, emmenagogue, febrifuge, refrigerant, stomachic[4, 7, 9, 14, 21, 165, 238]. It is taken internally in the treatment of liver complaints, indigestion, gastric infections and anorexia[238]. It should not be prescribed for patients with gastric or duodenal ulcers[238]. The root is harvested in

the autumn and dried for later use[4]. It is quite likely that the roots of plants that have not flowered are the richest in medicinal properties[4].

nrakta E. Asia - China, Japan. ksacta Thickets, grassy places and wet meadows at low elevations and in the mountains of C. and S. Japan[58].

propta Seed - best sown as soon as it is ripe in a light position in a cold frame[200]. It can also be sown in late winter or early spring but the seed germinates best if given a period of cold stratification and quickly loses viability when stored, with older seed germinating slowly and erratically[200, 239]. It is advantageous to keep the seed at about 10°C for a few days after sowing, to enable the seed to imbibe moisture[239]. Following this with a period of at least 5 - 6 weeks with temperatures falling to between 0 and -5°C will usually produce reasonable germination[239]. It is best to use clay pots, since plastic ones do not drain so freely and the moister conditions encourage the growth of moss, which will prevent germination of the seed[239]. The seed should be surface-sown, or only covered with a very light dressing of compost. The seed requires dark for germination, so the pots should be covered with something like newspaper or be kept in the dark[239]. Pot up the seedlings into individual pots as soon as they are large enough to handle and grow on in light shade in the greenhouse for at least their first winter. The seedlings grow on very slowly, taking 2 - 7 years to reach flowering size[239]. When the plants are of sufficient size, place them out into their permanent positions in late spring or early summer. Division in March[111]. Most members of this genus have either a single tap-root, or a compact root system united in a single root head, and are thus unsuitable for division[239]. Cuttings of basal shoots in late spring[238].

nwatta In general, gentians require a moist well-drained soil in a sheltered position, a certain minimum of atmospheric humidity, high light intensity but a site where temperatures are not too high[239]. They are therefore more difficult to grow in areas with hot summers and in such a region they appreciate some protection from the strongest sunlight[200, 239]. Most species will grow well in the rock garden[200]. This species is happy in any reasonable soil[239]. A moisture loving plant, preferring to grow with full exposure to the sun but with plenty of underground moisture in the summer, it grows better in the north and west of Britain[1]. A very ornamental plant[1]. Plants are intolerant of root disturbance[200].

5.2.632 *Acinos rotundifolius*

4 tin 8 cyuc 1 kcaak 0 tcan 1 dwat 0.3 m hkuc
htut cyutli hgatkyuctup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Acinos rotundifolius* is a ANNUAL/PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: Edible Uses: CondimentThe leaves are used as a flavouring with beans etc, and are said to be a substitute for summer savoury, *Satureia hortensis*[200], though we prefer that species[K].

dwatta Aphrodisiac StimulantAphrodisiac, stimulant[61].

nrakta S. Europe to Afghanistan in W. Asia. ksacta Not known

propta Seed - sow early spring in a cold frame. If you have sufficient seed then you could try sowing in situ in April or May. Germination should take place within a month. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer.

nwatta Succeeds in almost any well-drained soil, doing well in a hot dry soil[200].

5.2.633 *Ratibida columnifera*

Prairie Coneflower, Upright prairie coneflower, Woolly Cinquefoil, Praire Coneflower, Mexican Hat

kcakta Edible Parts: Leaves SeedEdible Uses: Young leaves - raw or cooked[105, 177]. Seed - raw or cooked. It is rather small and fiddly to utilize.

tcanta SoapThe plant produces a soft white mass, a froth like that of soap. It is used for bathing and washing clothes[272].

dwatta Antiseptic Astringent Febrifuge StomachicThe whole plant is antiseptic and astringent[178]. An infusion has been used in the treatment of stomach complaints and fevers[257]. The plant produces a soft white mass, a froth like that of soap. It is applied externally to burns[272].

nrakta Temperate regions of the northern hemisphere, including Britain. S. Africa. ksacta Swampy thickets, shores, damp clearings and cultivated fields in N. America[43].

propta Seed - sow spring in a cold frame. Germination is usually free and easy. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer if they have reached sufficient size. If not, overwinter them in a cold frame and plant them out the following spring after the last expected frosts.

nwatta Succeeds in an ordinary garden soil[1] but prefers a moisture retentive not too fertile soil in sun or part shade[200]. Repays generous treatment[1]. Plants seem to be immune to the predations of rabbits[233].

5.2.628 Paeonia officinalis

Peony, Common peony

4 tlin 10 cyuc 1 kcaak 0 tcan 2 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hrasljutnyikfrip hpa7tli flatprikliwis hpa7tmwatli fyfxre7t hjonli

drutta Paeonia officinalis is a PERENNIAL growing to 0.6 m (2ft) by 0.6 m (2ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in flower in May, and the seeds ripen in July. The species is hermaphrodite (has both male and female organs) and is pollinated by insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The entire plant is poisonous if taken in large doses[7, 21].

kcakta Edible Parts: FlowersEdible Uses: Condiment-Flowers - cooked. They can be used as a vegetable[177] or to scent tea[183]. The hot seeds are ground into a powder and used as a spice in ale or in the food that accompanies it[183]. (Does this mean that the seed is heated before grinding, or that it has a hot flavour?[K])

dwatta Anticonvulsant Antirheumatic Antispasmodic Diuretic Epilepsy Sedative TonicPeony root has been used medicinally for over 2,000 years and it gained a reputation as a treatment for epilepsy and to promote menstruation. This species was very popular up to the 16th century, but is little used in contemporary European herbalism, though it is sometimes employed where an antispasmodic and sedative are required[238, 254]. The root is antispasmodic, diuretic, sedative and tonic[4, 7, 21]. The root is harvested in the autumn from plants that are at least two years old and is dried for later use[4]. It has been successfully employed in the treatment of convulsions and spasmodic nervous affections such as epilepsy[4, 7]. It has also been used in the treatment of whooping cough whilst suppositories are sometimes made of the root to relieve anal and intestinal spasms[254]. This remedy should be used with caution and not at all by pregnant women. Large doses can be toxic[7, 21, 254]. A tea made from the dried crushed petals of various peony species has been used as a cough remedy, and as a treatment for haemorrhoids and varicose veins[250].

nrakta Europe - France to Albania. ksacta Rocky woodlands and meadows[1, 7], usually on limestone[187].

propta Seed - best sown as soon as it is ripe in a cold frame[250]. When sown fresh, the seed produces a root about 6 weeks after sowing with shoots formed in the spring[200]. Stored seed is much slower, it should be sown as soon as possible in a cold frame but may take 18 months or more to germinate[200]. The roots are very sensitive to disturbance, so many growers allow the seedlings to remain in their pots for 2 growing seasons before potting them up. This allows a better root system to develop that is more resilient to disturbance[250]. If following this practice, make

sure you sow the seed thinly, and give regular liquid feeds in the growing season to ensure the plants are well fed. We usually prick out the seedlings into individual pots as soon as they are large enough to handle, and then grow them on in a cold frame for at least two growing seasons before planting them out when they are in growth in the spring[K]. Division with great care in spring or autumn. Each portion must have a leaf bud. If the lifted root is stood in shade for several hours it becomes less brittle and easier to divide[200]. Divisions that have several buds will usually flower in the second year, but those that only have one or two buds will take a number of years before they have grown sufficiently to flower[250].

nwatta Landscape Uses:Border, Foundation, Seashore, Specimen. Requires a deep rich soil, preferably neutral or slightly alkaline[1, 233], doing quite well in sun or light shade[200]. Plants are tolerant of a wide range of soil conditions, but will not survive if the soil becomes waterlogged or is too dry[250]. This species is lime tolerant[200]. Plants grown on sandy soils tend to produce more leaves and less flowers, whilst those growing on clay take longer to become established but produce better blooms[250]. Plants can be naturalised in grass so long as the soil is good[233]. Hardy to about -25°C[187]. A very variable plant, there are at least 4 sub-species[250]. There are a number of named forms, selected for their ornamental value[187]. A long-lived plant, living for 50 years or more in gardens[200]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. A very greedy plant inhibiting the growth of nearby plants, especially legumes[54]. This species can spread fairly freely by means of its tuberous rootstock[233]. Strongly resents root disturbance, taking some time to recover after being divided[1]. Peony species are usually self-fertile, though they will also hybridise with other species if they flower nearby at the same time[250]. Plants take 4 - 5 years to flower from seed[200]. They generally breed true from seed[1]. Special Features:Not North American native, All or parts of this plant are poisonous, Suitable for cut flowers, Fragrant flowers.

5.2.629 Scilla scilloides

4 tlin 8 cyuc 1 kcaak 0 tcan 1 dwat 0.4 m hkuc hmimhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Scilla scilloides is a BULB growing to 0.4 m (1ft 4in) by 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from August to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves RootEdible Uses: Leaves - cooked[105, 177]. Bulb[105, 177]. No more details are given. The bulb is up to 2cm in diameter[200].

dwatta PouliticeThe bulbs are pounded and applied to abscesses[218].

nrakta E. Asia - China, Japan, Korea. ksacta Hills and lowland all over Japan[58].

propta Seed - best sown as soon as it is ripe in a cold frame. Sow the seed thinly and allow the seedlings to remain in the pot for their first year of growth, giving them liquid feeds if necessary. Prick out the young bulbs, 2-3 to a pot, when dormant and grow them on for their next two years in a frame. Plant them out into their permanent positions when dormant[200]. Division of established clumps when the foliage dies down in the summer[200]. The larger bulbs can be planted out direct into their permanent positions. We have found that it is best to pot up the smaller bulbs and grow them on in a cold frame for a year before planting them out when dormant in late summer.

nwatta Succeeds in full sun or light shade in a well-drained humus-rich soil with adequate moisture when in growth[200]. The hardiness of this plant varies according to provenance, the hardest forms tolerate temperatures down to about -15°C[200]. The flowers have a hyacinth-like aroma[245].

direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer. Cuttings can be taken at almost any time in the growing season, though early in the season is probably best.

nwatta Succeeds in most soils[188] but prefers a fertile well-drained soil that is not too dry[187]. Tolerates poor soils[233]. Succeeds in most soils and is tolerant of quite deep shade[219]. Established plants are drought tolerant[190], they grow well in dry soils and can be grown in crevices on walls[219]. Hardy to about -20°C[187]. This species has pink to red flowers[200]. All members of this genus are said to have edible leaves, though those species that have yellow flowers can cause stomach upsets if they are eaten in quantity[62, 85]. Polymorphic, intergrading with *S. caucasicum* where their ranges meet. Plants in this genus seem to be immune to the predations of rabbits[233]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. An evergreen. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is tuberous with swollen potato-like roots [1-2].

5.2.583 Gentiana pannonica

4 tlin 8 cyuc 1 kcaak 0 tcan 3 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Gentiana pannonica is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bumblebees, butterflies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta The root is sometimes used in the manufacture of gentian bitters[183].

dwatta Anthelmintic Antiinflammatory Antiseptic Bitter Cholagogue Emmenagogue Febrifuge Refrigerant Stomachic TonicThis species is one of several that are the source of the medicinal gentian root[4], the following notes are based on the general uses of *G. lutea* which is the most commonly used species in the West[K]. Gentian root has a long history of use as a herbal bitter in the treatment of digestive disorders and is an ingredient of many proprietary medicines. It contains some of the most bitter compounds known and is used as a scientific basis for measuring bitterness[238]. It is especially useful in states of exhaustion from chronic disease and in all cases of debility, weakness of the digestive system and lack of appetite[4]. It is one of the best strengtheners of the human system, stimulating the liver, gall bladder and digestive system[238], and is an excellent tonic to combine with a purgative in order to prevent its debilitating effects[4]. The root is anthelmintic, anti-inflammatory, antiseptic, bitter tonic, cholagogue, emmenagogue, febrifuge, refrigerant, stomachic[4, 7, 9, 14, 21, 165, 238]. It is taken internally in the treatment of liver complaints, indigestion, gastric infections and anorexia[238]. It should not be prescribed for patients with gastric or duodenal ulcers[238]. The root is harvested in the autumn and dried for later use[4]. It is quite likely that the roots of plants that have not flowered are the richest in medicinal properties[4].

nrakta C. Europe. ksacta Meadows and pastures, screes and grassy bottoms of alpine corries, amongst dwarf pine and in forests[239]. It is found on both limestone and acid rocks[239].

propta Seed - best sown as soon as it is ripe in a light position in a cold frame[200]. It can also be sown in late winter or early spring but the seed germinates best if given a period of cold stratification and quickly loses viability when stored, with older seed germinating slowly and erratically[200, 239]. It is advantageous to keep the seed at about 10°C for a few days after sowing, to enable the seed to imbibe moisture[239]. Following this with a period of at least 5 - 6 weeks with temperatures falling to between 0 and -5°C will usually produce reasonable germination[239]. It is best to use clay pots, since plastic ones do not drain so freely and the moister

conditions encourage the growth of moss, which will prevent germination of the seed[239]. The seed should be surface-sown, or only covered with a very light dressing of compost. The seed requires dark for germination, so the pots should be covered with something like newspaper or be kept in the dark[239]. Pot up the seedlings into individual pots as soon as they are large enough to handle and grow on in light shade in the greenhouse for at least their first winter. The seedlings grow on very slowly, taking 2 - 7 years to reach flowering size[239]. When the plants are of sufficient size, place them out into their permanent positions in late spring or early summer. Division of older plants in March[111, 239]. Cuttings of basal shoots in late spring[238].

nwatta In general, gentians require a moist well-drained soil in a sheltered position, a certain minimum of atmospheric humidity, high light intensity but a site where temperatures are not too high[239]. They are therefore more difficult to grow in areas with hot summers and in such a region they appreciate some protection from the strongest sunlight[200, 239]. Most species will grow well in the rock garden[200]. This species is not particular about soil type, so long as it is deep enough to accommodate the plant's roots[239]. Although sometimes found wild on alkaline soils, it prefers a neutral to slightly acid soil in cultivation[239]. A moisture loving plant, preferring to grow with full exposure to the sun but with plenty of underground moisture in the summer, it grows better in the north and west of Britain[1]. This species is closely related to *G. punctata* and *G. purpurea*[239]. Plants are intolerant of root disturbance[200]. The flowers have the scent of the old tea rose[245].

5.2.584 Ruta graveolens

Rue, Common rue, Herb of Grace, Garden Rue

4 tlin 10 cyuc 1 kcaak 0 tcan 3 dwat 0.5 m hkuc hmimhtut cyutli hगतkyuctup hwicli hyishrasljutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Ruta graveolens is an evergreen Shrub growing to 0.5 m (1ft 8in) by 0.5 m (1ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf all year, in flower from June to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

pcista All parts of this plant are poisonous in large quantities[19]. It should not be used at all by pregnant women since it can induce abortions[165]. The sap contains furanocoumarins, sensitizing the skin to light and causing blistering or dermatitis in sensitive people[200].

kcakta Edible Parts: LeavesEdible Uses: Condiment Rutin TeaLeaves - raw or used as a seasoning[2, 7, 19, 21, 27, 89]. It is occasionally eaten in salads[4], but is strongly aromatic and slightly toxic, so should only be used in small quantities[7, 19, 148, 183]. The taste is strong and bitter[238]. The leaves contain rutin, which has a beneficial effect upon the circulatory system[218]. Some caution is advised, see notes on toxicity above. The leaves can be brewed into a tea[183].

tcanta Dye Essential Repellent StrewingThe growing or the dried plant can be used to repel insects, it is most useful when the plant is grown near roses and raspberries[4, 14, 18, 20, 148]. The dried herb can also be put in the linen cupboard to repel moths[14, 18]. The growing plant is also said to repel cats[20]. A red dye is obtained from the plant[148]. An essential oil is obtained from the leaves and young shoots, it is used in perfumery and as a food flavouring[61]. The plant was formerly used as a strewing herb[148]. Plants can be grown for ground cover when planted about 45cm apart each way[208]. They can be trimmed back in spring to keep them bushy[208].

dwatta Abortifacient Anthelmintic Antidiarrhoeal Antidote Antiinflammatory Antispasmodic Carminative Emetic Emmenagogue Expectorant Haemostatic Homeopathy Ophthalmic Rubefacient Stimulant StomachicRue has a long history of use as a domestic remedy, being especially valued

for its strengthening action on the eyes[4]. The plant contains flavonoids (notably rutin) that reduce capillary fragility, which might explain the plants reputation as an eye strengthener[238]. Some caution is advised in its use internally, however, since in large doses it is toxic and it can also cause miscarriages[4, 7, 238]. The whole herb is abortifacient, anthelmintic, antidote, antispasmodic, carminative, emetic, emmenagogue, expectorant, haemostatic, ophthalmic, rubefacient, strongly stimulant, mildly stomachic and uterotonic[4, 7, 21, 165, 218]. The tops of fresh shoots are the most active medicinally, they should be gathered before the plant flowers and can be used fresh or dried[4]. An infusion is used in the treatment of hysterical affections, coughs, flatulence etc[4]. The juice of the plant has been used in treating earaches and chewing a leaf or two is said to quickly bring relief from giddiness, nervous headaches, palpitations etc[4]. An alkaloid found in the plant is abortifacient, anti-inflammatory and antispasmodic[218]. A homeopathic remedy is obtained from the fresh herb, harvested in early summer shortly before flowering begins[232]. This is used in the treatment of a variety of complaints including eye strain, headache and sprains[232].

nrakta S. Europe. ksacta Rocks, old walls and dry hills, mainly on limestone[89].

propta Seed - best sown as soon as it is ripe in a cold frame[200], it can also be sown in early to mid spring in a cold frame[14, 27]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of young shoots in late spring[1]. Cuttings of half-ripe wood, July/August in a frame[200]. Very easy[K]. Layering in early summer: Old plants often self-layer[200].

nwatta Landscape Uses:Border, Container, Massing, Rock garden, Specimen. Succeeds in any soil but is hardier in a poor dry soil[4, 37, 200]. Prefers an open sunny position[7, 182]. Prefers a partially shaded sheltered dry position but succeeds in full sun[1, 4, 200]. Prefers a well-drained or rocky soil[200]. Likes some lime in the soil[11]. Established plants are drought tolerant[190]. Hardy to about -10°C, possibly to lower temperatures when it is grown in a dry soil[187]. Often cultivated as a culinary and medicinal herb, there are some named varieties[187]. The bruised leaves have a pleasant orange-like fragrance[245]. It is one of the most pleasant herbs to inhale[245]. Rue releases its scent in a remarkable way. The essential oil is contained in a cavity immediately beneath the surface of the leaf, above which is a thin layer of cells pierced by a cavity in the middle. The cells swell up and bend inwards, pressing on the essential oil beneath, which is driven to the surface of the leaf and there released[245]. Rue is a poor companion plant for many other species, growing badly with sage, cabbage and sweet basil[14, 18, 20, 201]. It is a good companion for roses and raspberries[201]. Plants in this genus are notably resistant to honey fungus[200]. Special Features:Attractive foliage, Edible, Not North American native, Suitable for cut flowers, Suitable for dried flowers.

5.2.585 *Acinos alpinus*

Alpine Calamint

4 tlin 8 cyuc 1 kcaak 0 tcan 1 dwat 0.5 m hkuc htut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatprilkwis hpa7tmwatli xre7t hjonli

drutta *Acinos alpinus* is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: Edible Uses: Condiment TeaThe leaves are used as a flavouring in cooked dishes[183] and also as a tea substitute[148].

dwatta Diaphoretic FebrifugeDiaphoretic, febrifuge[148]. nrakta C. and S. Europe ksacta Dry sunny habitats in mountains and rocky places[50, 148].

propta Seed - sow early spring in a cold frame. If you have sufficient seed then you could try sowing in situ in

April or May. Germination should take place within a month. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring. Basal cuttings in late spring.

nwatta Succeeds in almost any well-drained soil, doing well in a hot dry soil[200].

5.2.586 *Rhodiola rhodantha*

Queen's Crown, Redpod stonecrop

4 tlin 8 cyuc 1 kcaak 0 tcan 0 dwat 0.4 m hkuc htut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatprilkwis hpa7tmwatli fyixre7t hjonli

drutta *Rhodiola rhodantha* is a PERENNIAL growing to 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked as a potherb[183, 212]. Chopped finely and added to salads[183]. Best used when they are young[83].

nrakta Western N. America - Arizona to Montana. ksacta Moist places in tundra or in meadows and by streams in the Rocky Mountains to 2700 metres[83].

propta Seed - surface sow in spring in well-drained soil in a sunny position in a greenhouse. Do not allow the soil to dry out. Prick out the seedlings into individual pots when they are large enough to handle, and grow them on in the greenhouse for their first winter. Plant out in early summer of the following year. Division in spring or early summer. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Prefers a fertile well-drained soil in a sunny position[200]. Established plants are drought tolerant[200]. A good plant for the flower border[83]. This species has pink to white flowers[200]. All members of this genus are said to have edible leaves, though those species that have yellow flowers can cause stomach upsets if they are eaten in quantity[62, 85].

5.2.587 *Helenium hoopesii*

Owls Claws, Orange Sneezeweed

4 tlin 8 cyuc 1 kcaak 0 tcan 1 dwat 0.9 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprilkwis hpa7tmwatli xre7t hjonli

drutta *Helenium hoopesii* is a PERENNIAL growing to 0.9 m (3ft) by 0.5 m (1ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from June to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista This species is said to be poisonous to sheep. Although no mention of any toxicity to people has been seen it is wise to assume that it is toxic[187].

kcakta Edible Parts: Edible Uses: GumA chewing gum is obtained from the roots[155, 257].

tcanta Dye Gum MiscellanyA yellow dye is obtained from the flowers[155]. They are usually boiled up with juniper ash to obtain the dye[244].

dwatta Miscellany StomachicThe plant is used as a remedy for vomiting[155, 257]. A snuff made from the crushed blossoms and the leaves of *Psoraleidol* lanceolatum has been inhaled in the treatment of headaches and hay fever[257].

nrakta South-western N. America. ksacta Rich soils in coniferous forests, in meadows along stream sides and on

woodland) or no shade. It prefers moist or wet soil and can grow in water.

kcakta Edible Parts: Edible Uses: TeaA tea is made from the leaves and flowers[46, 61, 177, 183].

tcanta Can be used as a ground cover plant in moist soils but requires weeding for the first year or so. Plants should be spaced about 60cm apart each way and form a carpet, rooting as they spread[208].

dwatta Antidiarrhoeal Antiscorbutic Astringent Diuretic VulneryThe whole herb, used fresh or dried, is antiscorbutic, mildly astringent, diuretic and vulnerary[4, 9, 46]. For drying, the herb is harvested in June[4]. Creeping Jenny is a very good wound-herb, the fresh leaves being bruised and applied externally to the affected area[4]. An infusion is used to treat internal bleeding and diarrhoea[9].

nrakta Europe, including Britain, from Sweden south and east to Spain, N. Greece and the Caucasus. ksacta Damp situations in pastures and by the sides of streams, avoiding acid soils[4, 9].

propta Seed - sow spring or autumn in a cold frame[200]. This species rarely produces seed in Britain[17]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn[200]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Landscape Uses:Container, Ground cover, Rock garden, Woodland garden. An easily grown plant, succeeding in a moist loamy soil[1]. Grows well in heavy clay soils. Grows well in marshy soil and in shallow water in pond margins[24, 56]. Prefers a shady position[111] but also succeeds in full sun[188]. Plants are hardy to at least -25°C[187]. Most species in this genus seem to be immune to the predations of rabbits[233]. A very ornamental plant[1]. Special Features:Attractive foliage, Invasive, Naturalizing, Fragrant flowers, Inconspicuous flowers or blooms.

5.2.626 *Gentiana scabra*

Long Dan Cao

4 tlin 8 cyuc 1 kcaak 0 tcan 3 dwat 0.3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprilkwis hpa7tmwatli xre7t hjonli

drutta *Gentiana scabra* is a PERENNIAL growing to 0.3 m (1ft) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bumblebees, butterflies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young plant and old leaves - cooked[105]. A famine food, used when all else fails[177, 179].

dwatta Anodyne Anthelmintic Antiinflammatory Antiseptic Bitter Chologogue Eczema Emmenagogue Expectorant Febrifuge Pectoral Refrigerant Stomachic Tonic UrinaryLong Dan Cao is used as a bitter tonic in Chinese herbalism where it promotes digestive secretions and treats a range of illnesses associated with the liver[254, 279]. The root is antibacterial and stomachic[176]. It is used in the treatment of anorexia, dyspepsia, jaundice, leucorrhoea, eczema, conjunctivitis, sore throat, acute infection of the urinary system, hypertension with dizziness and tinnitus[176, 279]. The root is harvested in the autumn and dried for later use. This species is one of several that are the source of the medicinal gentian root[4], the following notes are based on the general uses of *G. lutea* which is the most commonly used species in the West[K]. Gentian root has a long history of use as a herbal bitter in the treatment of digestive disorders and is an ingredient of many proprietary medicines. It contains some of the most bitter compounds known and is used as a scientific basis for measuring bitterness[238]. It is especially useful in states of exhaustion from chronic disease and in all cases of debility, weakness of the digestive system and lack of appetite[4]. It is one of the best strengtheners of the human system, stimulating the liver, gall bladder and digestive system[238], and is an excellent tonic to combine with a purgative in order to prevent its debilitating effects[4]. The root is anthelmintic,

anti-inflammatory, antiseptic, bitter tonic, chologogue, emmenagogue, febrifuge, refrigerant, stomachic[4, 7, 9, 14, 21, 165, 238]. It is taken internally in the treatment of liver complaints, indigestion, gastric infections and anorexia[238]. It should not be prescribed for patients with gastric or duodenal ulcers[238]. The root is harvested in the autumn and dried for later use[4]. It is quite likely that the roots of plants that have not flowered are the richest in medicinal properties[4].

nrakta E. Asia - China, Japan. ksacta Thickets, grassy places and wet meadows at low elevations and in the mountains of C. and S. Japan[58].

propta Seed - best sown as soon as it is ripe in a light position in a cold frame[200]. It can also be sown in late winter or early spring but the seed germinates best if given a period of cold stratification and quickly loses viability when stored, with old seed germinating slowly and erratically[200, 239]. It is advantageous to keep the seed at about 10°C for a few days after sowing, to enable the seed to imbibe moisture[239]. Following this with a period of at least 5 - 6 weeks with temperatures falling to between 0 and -5°C will usually produce reasonable germination[239]. It is best to use clay pots, since plastic ones do not drain so freely and the moister conditions encourage the growth of moss, which will prevent germination of the seed[239]. The seed should be surface-sown, or only covered with a very light dressing of compost. The seed requires dark for germination, so the pots should be covered with something like newspaper or be kept in the dark[239]. Pot up the seedlings into individual pots as soon as they are large enough to handle and grow on in light shade in the greenhouse for at least their first winter. The seedlings grow on very slowly, taking 2 - 7 years to reach flowering size[239]. When the plants are of sufficient size, place them out into their permanent positions in late spring or early summer. Division in March[111]. Most members of this genus have either a single tap-root, or a compact root system united in a single root head, and are thus unsuitable for division[239]. Cuttings of basal shoots in late spring[238].

nwatta In general, gentians require a moist well-drained soil in a sheltered position, a certain minimum of atmospheric humidity, high light intensity but a site where temperatures are not too high[239]. They are therefore more difficult to grow in areas with hot summers and in such a region they appreciate some protection from the strongest sunlight[200, 239]. Most species will grow well in the rock garden[200]. This species requires a moist well-drained neutral to acid soil[200, 238]. Another report says that it is happy in any reasonable soil[239]. A moisture loving plant, preferring to grow with full exposure to the sun but with plenty of underground moisture in the summer, it grows better in the north and west of Britain[1]. A very ornamental plant[1]. Plants are intolerant of root disturbance[200].

5.2.627 *Polygonum lapathifolium*

Curlytop Knotweed

4 tlin 8 cyuc 1 kcaak 0 tcan 1 dwat 0.8 m hkuc hmimhtut cyutli tcuphia7n hwicli hrasjlutnyik hpa7tli flatprilkwis hpa7tmwatli xre7t hjonli

drutta *Polygonum lapathifolium* is a ANNUAL growing to 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 5. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

pcista Although no specific mention has been made for this species, there have been reports that some members of this genus can cause photosensitivity in susceptible people. Many species also contain oxalic acid (the distinctive lemony flavour of sorrel) - whilst not toxic this substance can bind up other minerals making them unavailable to the body and leading to mineral deficiency. Having said that, a number of common foods such as sorrel and rhubarb contain oxalic acid and the leaves of most members of this genus are nutritious and beneficial to eat in moderate quantities. Cooking the leaves will reduce their content of oxalic acid. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Edible Parts: Leaves StemEdible Uses: Young leaves and leaf stems - cooked[105]. Not very tasty[116].

tcanta A useful ground cover plant, succeeding in dense shade, though rather slow spreading[197]. Plants should be spaced about 45cm apart each way[208].

nrakta E. Asia - N. Japan. ksacta Damp lakeside moorlands[251].

propta Seed - sow spring in a lightly shaded position in a greenhouse and only just cover the seed. Germination usually takes place within 1 - 3 months at 10°C. Make sure you keep the compost moist. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division is possible at almost any time of the year so long as there is sufficient moisture[233]. It is best carried out in March as growth commences or in early autumn if the soil is not too dry[200]. Hostas can be left undivided for many years and should not be divided any more frequently than once every 3 - 5 years to allow the leaves to reach maturity[200].

nwatta Thrives in most fertile soils if they are rich in humus[200]. Grows well in heavy clay soils and in sandy ones[208]. Very limy soils inhibit growth, but plants can thrive in such a situation if plenty of humus is added[208]. Prefers a pH between 6 and 7[200]. Requires a rich soil that does not dry out readily[1]. Succeeds in full sun as well as in deep shade, growing well in the semi-shade of a woodland[200, 233]. In general, the sunnier the position the moister the soil should be[233]. Plants are best not grown under trees in town gardens since the soot washed from the leaves of the trees in wet weather will tend to remain on the hosta[208]. Plants flower better when grown in a sunny position but the foliage is better when the plant is in a shady position[200]. Plants are in general fully hardy in Britain, but young leaves in spring can be destroyed by frost. New leaves are only produced in the spring and very early summer, so any damage at this time has a deep effect on the plant[233]. A robust plant, forming medium-size to large clumps, the rhizome is slightly stoloniferous[200]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Plants are very attractive to slugs and snails, the young shoots in spring are especially at risk[111, K]. Hybridizes freely with other members of this genus[200].

5.2.623 Mertensia ciliata

Mountain Bell, Tall fringed bluebells

4 tin 8 cyuc 1 kcaak 0 tcan 1 dwat 0.8 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Mertensia ciliata is a PERENNIAL growing to 0.8 m (2ft 7in) by 0.3 m (1ft). See above for USDA hardness. It is hardy to UK zone 4. It is in flower from May to July. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: Flowers LeavesEdible Uses: Flowers - raw[172]. Leaves - raw or cooked[172]. The leaves are rather hairy and are not so nice when eaten raw[172].

dwatta Antipruritic GalactogogueThe plant is galactogogue[257]. An infusion has been used to increase the milk flow of nursing mothers[257]. An infusion of the powdered root has been used to relieve the itching caused by smallpox and measles[257].

nrakta South-western N. America - Oregon to New Mexico. ksacta Streambanks, wet meadows, damp thickets and wet cliffs from the foothills to high elevations in the mountains[60, 172].

propta Seed - best sown in a cold frame as soon as it is ripe[1, 200]. Sow stored seed as early in the year as possible. Protect from direct sunlight[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division, with care, in early spring or autumn[200].

nwatta Easily grown in an ordinary garden soil with some shade[1, 111]. Requires a moist peaty soil in full sun

or light shade[187]. Plants are hardy to about -20°C[187]. A very ornamental plant[1].

5.2.624 Sedum aizoon

Sedum

4 tin 10 cyuc 1 kcaak 0 tcan 1 dwat 0.4 m hkuc htut cyutli hgatkuyctcup hwicli hyishrasljutnyik hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta Sedum aizoon is an evergreen Perennial growing to 0.4 m (1ft 4in) by 0.4 m (1ft 4in) at a medium rate. See above for USDA hardness. It is hardy to UK zone 7 and is not frost tender. It is in leaf all year, in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista Although not poisonous, if large quantities of this plant are eaten it can cause a stomach upset[62, 85].

kcakta Edible Parts: LeavesEdible Uses: Leaves and young stems - raw or cooked[105, 177]. There is a definite bitterness in the flavour, few people would want to eat them as a regular part of their diet[K].

dwatta The plant is used medicinally[266]. No further information is given.

nrakta E. Asia - Siberia to Japan. A garden escape in N. and C. Europe[50]. ksacta Dry grassy slopes, dry shrub thickets, dry meadows, rock streams and sandy cliffs[74].

propta Seed - surface sow in spring in well-drained soil in a sunny position in a greenhouse. Do not allow the soil to dry out. Prick out the seedlings into individual pots when they are large enough to handle. If sufficient growth is made, it is possible to plant them out during the summer, otherwise keep them in a cold-frame or greenhouse for their first winter and plant them out in early summer of the following year[K]. Division is very easy and can be carried out at almost any time in the growing season, though is probably best done in spring or early summer. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Landscape Uses:Border, Container, Ground cover, Rock garden. A very easily grown plant, it succeeds in most soils[188], tolerating those on the poor side[233], though it prefers a fertile well-drained soil[200]. Established plants are drought tolerant[200] although it prefers a soil that stays moist in the summer[187]. Requires a sunny position[188]. Hardy to -15°C according to one report[200] whilst another says that it is hardy to about -25°C[187]. A polymorphic species[1]. Butterflies are attracted to the flowers of this plant[233]. All members of this genus are said to have edible leaves, though those species, such as this one, that have yellow flowers can cause stomach upsets if they are eaten in quantity[62, 85]. Plants in this genus seem to be immune to the predations of rabbits[233]. Special Features:Attractive foliage, Not North American native, Naturalizing, Attracts butterflies, Attractive flowers or blooms.

5.2.625 Lysimachia nummularia

Creeping Jenny, Moneywort, Creeping Charlie

4 tin 8 cyuc 1 kcaak 0 tcan 2 dwat 0.2 m hkuc hmimhtut cyutli tcuphja7nhs6s hwicli hrasljutnyikfrip hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta Lysimachia nummularia is an evergreen Perennial growing to 0.2 m (0ft 8in) by 0.6 m (2ft) at a fast rate. It is in leaf all year, in flower from June to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light

wet slopes, 2250 - 3300 metres in the Southern Rockies[71, 155].

propta Seed - sow spring in a greenhouse. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. If you have sufficient seed it might be worthwhile trying a sowing in mid to late spring in situ outdoors[111]. Cuttings of soft wood from the base of the plant, June/July in a frame. Basal cuttings in spring[200]. Harvest the shoots when they are about 10 - 15cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer. Division in spring or autumn[111]. This needs to be done fairly regularly because the clumps soon become congested[233]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Landscape Uses:Border, Container. Grows well in ordinary garden soil[1, 111], succeeding in most conditions other than boggy soils[233]. It prefers a fertile moisture retentive soil[200] in a sunny position[108, 111]. Dislikes dry soil[200]. This species is hardy to about -25°C[187]. Plants seem to be immune to the predations of rabbits[233]. A good bee and butterfly plant. Special Features:North American native, All or parts of this plant are poisonous, Suitable for cut flowers.

5.2.588 Solidago spathulata

Coast Goldenrod, Creeping Goldenrod

4 tin 9 cyuc 1 kcaak 0 tcan 1 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Solidago spathulata is a PERENNIAL growing to 0.6 m (2ft) at a fast rate. See above for USDA hardness. It is hardy to UK zone 8. It is in flower from June to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Leaves SeedEdible Uses: TeaLeaves and flowering stems - cooked[172]. Seed - used as a thickener in soups etc[172]. The seed is very small and fiddly to harvest[K]. A tea is made from the leaves and flowers[172].

tcanta Mustard, orange and brown dyes can be obtained from the whole plant[168].

dwatta Antiseptic Haemostatic SalveThe flowering stems are antiseptic, haemostatic and salve[168, 172]. An infusion of the dried powdered herb can be used as an antiseptic[168]. A poultice of the toasted, powdered leaves has been mixed with oil and used in the treatment of mumps[257].

nrakta Western N. America - California to Oregon. ksacta Found in a wide range of habitats from coastal sand dunes to inland and alpine areas[60].

propta Seed - sow spring in a cold frame. Only just cover the seed and do not allow the compost to become dry. Prick out the seedlings into individual pots when they are large enough to handle, and grow them on for their first winter in pots. Plant them out into their permanent positions in spring or early summer. Division in spring or autumn. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Landscape Uses:Border, Ground cover, Specimen, Woodland garden. Succeeds in any moderately fertile moisture retentive soil in sun or semi-shade[200]. Grows well in heavy clay soils. Judging by the plants native habitat, it is likely to be tolerant of maritime exposure[K]. This species is not hardy in the colder areas of Britain, it tolerates temperatures down to between -5 and -10°C[200]. A rather greedy plant, it is apt to impoverish the soil[1]. The

plant attracts various beneficial insects such as ladybirds, lacewings and hoverflies to the garden, these insects will help to control insect pests in the garden[201, 238]. Special Features:Attractive foliage, North American native, Invasive, Naturalizing, Attracts butterflies, Suitable for cut flowers, Suitable for dried flowers, Extended bloom season in Zones 9A and above.

5.2.589 Hordeum jubatum

Foxtail Barley, Intermediate barley

4 tin 8 cyuc 1 kcaak 0 tcan 1 dwat 0.3 m hkuc htut cyutli hgatkuyctcup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Hordeum jubatum is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardness. It is hardy to UK zone 5. It is in flower in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista The barbed awns around the seeds can work their way into the gums and digestive tract of animals when the seed is eaten, causing irritation and inflammation[212]. They can also work their way into the ears and eyes, sometimes causing blindness and even death[212].

kcakta Edible Parts: SeedEdible Uses: CoffeeSeed - raw or cooked[2, 105, 161, 257]. The seed can be ground into a flour and used as a cereal in making bread, porridge etc[177, 183]. Native North Americans would eat the dry flour raw[257]. The seed is exceedingly small and fiddly to use[K]. The roasted seed is used as a coffee substitute[183].

dwatta The dry root can be wrapped, then moistened and used as a compress for styes in the eyes or on swollen eyelids[257].

nrakta Most areas of N. America to Siberia. An occasional casual in Britain. ksacta Grassy bushy places below 2500 metres in California.

propta Seed - sow in situ in March or October and only just cover the seed. Make sure the soil surface does not dry out if the weather is dry. Germination takes place within 2 weeks. Division in spring. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Prefers a rather dry soil[1] and a sunny position[200]. Succeeds in most soils and in climates ranging from sub-arctic to sub-tropical[171]. Easily grown in light soils[162]. Established plants are drought resistant[190]. A very short-lived plant, it is often only an annual[162], though it often self sows a little[190].

5.2.590 Bromus carinatus

Californian Brome

4 tin 8 cyuc 1 kcaak 1 tcan 0 dwat 0.8 m hkuc hmimhtut cyutli hgatkuyctcup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta Bromus carinatus is a ANNUAL/BIENNIAL growing to 0.8 m (2ft 7in). See above for USDA hardness. It is hardy to UK zone 5. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind, Cleistogomy (self-pollinating without flowers ever opening). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: SeedEdible Uses: Seed - cooked[161, 177]. Used as a piñole[183].The dried seed can be ground into a powder and mixed with water to make a mush or made into bread[257]. The seed is rather small and fiddly to utilize[K].

tcanta Used for control of erosion and revegetation of damaged land, as well as a highly palatable forage for livestock.

nrakta Western N. America - British Columbia to California and New Mexico. Naturalized in Britain[17]. ksacta

Various habitats from moist woods to dry open meadows or sagebrush covered hills, sometimes to the timber line[60]. Found naturalized along the Thames at Kew and Oxford[17].

propta Seed - sow spring or autumn in situ and only just cover. Germination should take place within 2 weeks. If seed is in short supply it can be surface sown in a cold frame in early spring. When large enough to handle, prick out the seedlings into individual pots and plant them out in early summer. Division in spring. Large clumps can be planted out direct into their permanent positions whilst it is best to pot up smaller clumps and grow them on in a cold frame until they are ready to be planted out.

nwatta We have very little information on this species and do not know if it will be hardy in Britain, though judging by its native range it should succeed outdoors in many parts of this country. A potential perennial cereal crop, it is able to survive summer droughts without needing irrigation[183]. Tolerates a pH in the range 5.3 to 7.8. The plant has cleistogamous flowers - these do not open in the usual way but are self-pollinated by the plant. The following notes are based on the general needs of the genus. Succeeds in a sunny position in most well-drained soils[138, 200].

5.2.591 *Carlina acanthifolia*

4 tlin 8 cyuc 1 kcaak 0 tcan 0 dwat 0.6 m hkuc htut cyutli kyuctcup hwicli hyishrasjlutnyik hpa7tli flatprikklwis hpa7tmwatli fyifxre7t hjonli

drutta *Carlina acanthifolia* is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in June, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: FlowersEdible Uses: Flowering head - cooked. Used as a globe artichoke substitute[2, 105, 177, 183], though they are considerably smaller and even more fiddly[K].

nrakta S. Europe. ksacta Stony places, pastures and rocks[100] on poor soils[200] in mountainous areas[50].

propta Seed - surface sow in a cold frame in the spring. The seed usually germinates in 4 - 8 weeks at 15°C[138]. As soon as they are large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in the summer. Division in spring[111]. Difficult to do successfully because the plant resents root disturbance[138].

nwatta Succeeds in a sunny position in ordinary garden soil[111]. Prefers an alkaline soil[138]. Prefers a poor soil[200]. Plants are hardy to about -15°C[200]. A very ornamental plant[1]. This species resents root disturbance, it should be planted into its final position as soon as possible[138].

5.2.592 *Lithospermum ruderal*

Western Gromwell, Western Stoneseed

4 tlin 8 cyuc 1 kcaak 0 tcan 2 dwat 0.8 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatprikklwis hpa7tmwatli xre7t hjonli

drutta *Lithospermum ruderal* is a PERENNIAL growing to 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 4. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: SeedEdible Uses: The seeds have been used for food[257].

tcanta Beads DyeThe plant has been used as a dye and body paint[238]. No more details are given in the report, but it is likely that the root is used and the colour is some shade of red[K]. The hard, white, shiny seeds have been used as beads[257].

dwatta Antirheumatic Astringent Contraceptive Diuretic KidneyAn infusion or decoction of the root has been used as a diuretic in the treatment of kidney complaints and also to treat internal haemorrhaging, diarrhoea etc[61, 257]. A poultice of the dried powdered leaves and stems has been used to relieve the pain of rheumatic joints[257]. Some N. American Indian women drank a cold water infusion of the roots daily for six months to ensure permanent sterility[213]. Alcoholic extracts of the plant have been shown to eliminate the oestrus cycle and decrease the weight of the thymus and pituitary glands[213].

nrakta Western N. America - British Columbia to California. ksacta Open, fairly dry places from the foothills to moderate elevations[60].

propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings. Division.

nwatta Prefers a sunny position in a moderately fertile well-drained soil[200].

5.2.593 *Astilbe thunbergii*

Astilbe

4 tlin 9 cyuc 1 kcaak 3 tcan 0 dwat 0.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikklwis hpa7tmwatli xre7t hjonli

drutta *Astilbe thunbergii* is a PERENNIAL growing to 0.5 m (1ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: TeaYoung leaves - cooked[177, 183]. The leaves are a tea substitute[183].

tcanta Landscape Uses: Border, Container, Massing, Woodland garden. Special Features: Attractive foliage. Dynamic accumulator.

nrakta E. Asia - Japan. ksacta Sunny grassy slopes, C. and S. Japan[58].

propta Seed - we have no details for this species but suggest sowing the seed in a greenhouse in early spring. Only just cover the seed. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame until they are at least 20cm tall. Plant them out in the summer, or late in the following autumn. Division in spring. This is best done every 3 - 4 years in order to maintain the vigour of the plant[200]. Larger divisions can be planted straight into their permanent positions whilst smaller clumps are best potted up and kept in a cold frame until they are growing away well.

nwatta Succeeds in a rich garden soil if this stays reliably moist in the summer[1]. Requires a wet or moist peaty soil in sun or partial shade[187]. Prefers a pH in the range 5.5 to 7[200]. Prefers partial shade[200]. The plant is found in sunny habitats in the wild[58]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233].

5.2.594 *Hosta clausa*

4 tlin 8 cyuc 1 kcaak 0 tcan 0 dwat 0.2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikklwis hpa7tmwatli xre7t hjonli

drutta *Hosta clausa* is a PERENNIAL growing to 0.2 m (0ft 8in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young leaves - cooked[105, 177].

drutta *Lobelia sessilifolia* is a PERENNIAL growing to 0.7 m (2ft 4in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

pcista The plant contains a toxic alkaloid[179]. It contains the alkaloid lobeline which has a similar effect upon the nervous system as nicotine[274].

kcakta Edible Parts: LeavesEdible Uses: The buds and young plants are cooked and used as a famine food[177, 179]. Caution is advised because they contain a toxic alkaloid[179].

nrakta E. Asia - Japan. ksacta Wet places in lowland and mountains all over Japan[58].

propta Seed - best sown as soon as it is ripe in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring[200]. Basal cuttings in spring[1]. Harvest the shoots when they are about 10cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer. Layering in moist sand, it forms roots at the nodes[200].

nwatta Requires a wet soil[1].

5.2.619 *Dianthus plumarius*

Pink, Feathered pink, Cottage Pink

4 tlin 9 cyuc 1 kcaak 0 tcan 0 dwat 0.4 m hkuc htut cyutli kyuctcup hwicli hyishrasjlutnyik hpa7tli prikklwis hpa7tmwatli xre7t hjonli

drutta *Dianthus plumarius* is an evergreen Perennial growing to 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 3. It is in leaf all year; in flower from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: FlowersEdible Uses: The petals are made into cordials, syrups, sauces, vinegars etc[183].

nrakta E. Europe. Naturalized in Britain. ksacta Grows in old walls in many parts of Britain[17].

propta Seed - sow spring in a greenhouse. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings, taken at flowering time, with four pairs of leaves and trimmed just below a joint[200].

nwatta Landscape Uses:Alpine garden, Border, Container, Rock garden, Seashore, Specimen. Prefers a neutral to slightly alkaline soil in a sunny well-drained position[200]. Succeeds in dry soils and in poor soils[200]. Plants can be grown on walls[200]. There are many named forms, selected for their ornamental value[200]. The flowers are very fragrant[17], diffusing a powerful clove-like scent[245]. Individual plants become rather untidy after a few years and are best replaced every 2 - 4 years[200]. Some older cultivars, such as 'Sops in Wine' have a tendency to flower themselves to death. These should be grown in a richer soil in order to encourage the production of more foliage and should not be allowed to flower in their first year[200]. Special Features:Attractive foliage, Suitable for cut flowers, Fragrant flowers.

5.2.620 *Carex disticha*

Two-rank sedge

4 tlin 8 cyuc 1 kcaak 0 tcan 0 dwat 0.5 m hkuc hmimhtut cyutli tucuphja7n hwicli hrasjlutnyik hpa7tli flatprikklwis hpa7tmwatli hjonli

drutta *Carex disticha* is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to

UK zone 5. It is in flower from June to July, and the seeds ripen from July to August. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: Root SeedEdible Uses: Root - cooked[172]. Seed[172]. No further details are given, but the seed is small and fiddly to use[K].

tcanta BeddingThe leaves are used for bedding[61].

nrakta Central and northern Europe, including Britain, occasional in S. Europe, east to Siberia. ksacta Damp grassy places, fens, marshes and wet meadows[17].

propta Seed - sow in situ in the spring in a moist soil in light shade. If seed is in short supply it can be sown in a cold frame and be planted out in the summer. The seed usually germinates in 2 - 6 weeks at 15°C[138]. Division in spring[200]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the summer or following spring.

nwatta Easily grown in a damp to wet soil in full sun or shade[162, 200]. Members of this genus are rarely if ever troubled by browsing deer[233].

5.2.621 *Cardamine raphanifolia*

4 tlin 8 cyuc 1 kcaak 0 tcan 0 dwat 0.5 m hkuc pcmhmim cyutli tucuphja7n hwicli hrasjlutnyik hpa7tli flatprikklwis hpa7tmwatli fyifxre7t hjonli

drutta *Cardamine raphanifolia* is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist or wet soil.

kcakta Edible Parts: LeavesEdible Uses: We have no information on the edibility of this plant but the leaves are almost certainly edible[K].

tcanta Plants can be grown as a ground cover, making a fairly good carpet in a moist position[208].

nrakta Europe - France, Spain and Italy. Occasionally established in Britain. ksacta Damp places and streamides in mountains.

propta Seed - sow spring in a cold frame. Germination usually takes place within 1 - 3 weeks at 15°C[175]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in a greenhouse or cold frame for the first two years, planting them out when dormant in late summer. Division in early spring or after the plant dies down in the summer. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Prefers a moist humus rich soil in shade or semi-shade[200] but succeeds in most soils that are not dry[1]. Plants are closely related to *C. pratensis*[17].

5.2.622 *Hosta rectifolia*

4 tlin 8 cyuc 1 kcaak 0 tcan 0 dwat 0.6 m hkuc pcmhmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikklwis hpa7tmwatli xre7t hjonli

drutta *Hosta rectifolia* is a PERENNIAL growing to 0.6 m (2ft) by 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from August to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

soil[200]. Grows well in open woodland[1]. Succeeds in deep shade[188]. Succeeds in a sunny position if the soil does not dry out[42]. Any transplanting is best done whilst the plants are in flower[200]. Plants can flower in two years from seed[138]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233], though slugs are very fond of the leaves[238].

5.2.615 *Lysimachia barystachys*

Manchurian yellow loosestrife

4 tlin 8 cyuc 1 kcaak 0 tcan 0 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliw hpa7tmwatli xre7t hjonli

drutta *Lysimachia barystachys* is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young leaves and stems - cooked[177].

nrakta E. Asia - China, Japan, Korea, Siberia. ksacta Sunny hills and low elevations in mountains, central Japan[58]. Mountain meadows, grassy mountain slopes, among shrubs at elevations of 800 - 2000 metres[266].

propta Seed - sow autumn in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn[200]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta An easily grown plant, succeeding in a moist loamy soil[1]. Most species in this genus seem to be immune to the predations of rabbits[233].

5.2.616 *Arabis lyrata*

Rock Cress, Kamchatka rockcress, Lyrate rockcress

4 tlin 8 cyuc 1 kcaak 0 tcan 0 dwat 0.3 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatprikliw hpa7tmwatli xre7t hjonli

drutta *Arabis lyrata* is a BIENNIAL/PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young leaves - raw or cooked[177]. Rosettes of the lobed leaves are added to tossed salads or served as a green vegetable[257].

nrakta N. America - Alaska and southwards. N.E. Asia ksacta Ledges, cliffs (basic or circumneutral), gravels and sands[43]. Rocky and sandy places[235].

propta Seed - it is best to surface sow the seed as soon as it is ripe in a light position in a cold frame[134]. Seed can also be sown in spring. It usually germinates in 2 - 3 weeks at 21 °c[134]. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division after flowering[111]. Very easy, the divisions can be planted out straight into their permanent positions if required. Cuttings in a shady border in summer[1].

nwatta We have very little information on this species and do not know if it will be hardy in Britain, though judging by its native range it should succeed outdoors in many parts of this country. This species of rockcress is considered an important first brood nectar plant for 'Karnar Blue' butterfly (*Lycæides melissa samuelis* Nabokov), an endangered species in North America. The following notes are based on the general needs of the genus. Easily grown in ordinary well-drained soil[1].

5.2.617 *Hosta plantaginæ*

August Lily

4 tlin 8 cyuc 1 kcaak 0 tcan 1 dwat 0.6 m hkuc pcmhmmhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikliw hpa7tmwatli xre7t hjonli

drutta *Hosta plantaginæ* is a PERENNIAL growing to 0.6 m (2ft) by 1.2 m (4ft in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from July to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

pcista One report suggests the plant may be poisonous[178].

kcakta Edible Parts: Leaves StemEdible Uses: Young leaves and leaf stems - cooked[105, 177]. One report suggests the plant may be poisonous[178].

tcanta EssentialAn essential oil is obtained from the leaves, used in perfumery[178]. A useful ground cover plant, succeeding in dense shade, though rather slow spreading[197]. Plants should be spaced about 60cm apart each way[208].

dwatta CancerThe flowers are said to have anticancer activity[218].

nrakta E. Asia - China, Japan. ksacta Forests, grassy slopes and rocky places from near sea level to 2200 metres[266].

propta Seed - sow spring in a lightly shaded position in a greenhouse and only just cover the seed. Germination usually takes place within 1 - 3 months at 10°c. Make sure you keep the compost moist. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division is possible at almost any time of the year so long as there is sufficient moisture[233]. It is best carried out in March as growth commences or in early autumn if the soil is not too dry[200]. Hostas can be left undivided for many years and should not be divided any more frequently than once every 3 - 5 years to allow the leaves to reach maturity[200].

nwatta Thrives in most fertile soils if they are rich in humus[200]. Grows well in heavy clay soils and in sandy ones[208]. Very limy soils inhibit growth, but plants can thrive in such a situation if plenty of humus is added[208]. Prefers a pH between 6 and 7[200]. Requires a rich soil that does not dry out readily[1]. Succeeds in full sun as well as in deep shade, growing well in the semi-shade of a woodland[200, 233]. In general, the sunnier the position the moister the soil should be[233]. Plants are best not grown under trees in town gardens since the soot washed from the leaves of the trees in wet weather will tend to remain on the hosta[208]. Plants flower better when grown in a sunny position but the foliage is better when the plant is in a shady position[200]. This species tolerates quite a lot of sun[187]. Plants are in general fully hardy in Britain, but young leaves in spring can be destroyed by frost. New leaves are only produced in the spring and very early summer, so any damage at this time has a deep effect on the plant[233]. The plant forms open clumps[200]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Plants are very attractive to slugs and snails, the young shoots in spring are especially at risk[111, K]. A very ornamental plant[1], there are some named varieties[187]. The flowers open in the evening[188] and have a delicious lily-like fragrance[233]. The plant only flowers well when grown in a warm position[233], and is not really satisfactory when grown in most areas north of London[251.. Hybridizes freely with other members of this genus[200].

5.2.618 *Lobelia sessilifolia*

4 tlin 8 cyuc 1 kcaak 0 tcan 0 dwat 0.7 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatprikliw hpa7tmwatli xre7t hjonli

tcanta The plant has a stoloniferous habit and makes an excellent dense ground cover[251].

nrakta E. Asia - Korea. ksacta Along the banks of rivers where it is subject to periodic inundation[251].

propta Seed - sow spring in a lightly shaded position in a greenhouse and only just cover the seed. Germination usually takes place within 1 - 3 months at 10°c. Make sure you keep the compost moist. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division is possible at almost any time of the year so long as there is sufficient moisture[233]. It is best carried out in March as growth commences or in early autumn if the soil is not too dry[200]. Hostas can be left undivided for many years and should not be divided any more frequently than once every 3 - 5 years to allow the leaves to reach maturity[200].

nwatta Thrives in most fertile soils if they are rich in humus[200]. Grows well in heavy clay soils and in sandy ones[208]. Very limy soils inhibit growth, but plants can thrive in such a situation if plenty of humus is added[208]. Prefers a pH between 6 and 7[200]. Requires a rich soil that does not dry out readily[1]. Succeeds in full sun as well as in deep shade, growing well in the semi-shade of a woodland[200, 233]. In general, the sunnier the position the moister the soil should be[233]. Plants are best not grown under trees in town gardens since the soot washed from the leaves of the trees in wet weather will tend to remain on the hosta[208]. Plants flower better when grown in a sunny position but the foliage is better when the plant is in a shady position[200]. Plants are in general fully hardy in Britain, but young leaves in spring can be destroyed by frost. New leaves are only produced in the spring and very early summer, so any damage at this time has a deep effect on the plant[233]. A spreading plant with stoloniferous roots, forming medium size clumps[200, 233]. A triploid species that is not often found in the wild, it does not flower very freely and indeed there are forms that do not flower at all[251]. The cultivar 'Normalis' flowers more freely and is very showy, but is less stoloniferous and therefore less suitable for ground cover[251]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Plants are very attractive to slugs and snails, the young shoots in spring are especially at risk[111, K]. Hybridizes freely with other members of this genus[200].

5.2.595 *Narcissus jonquilla*

Jonquil

4 tlin 8 cyuc 1 kcaak 0 tcan 0 dwat 0.3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikliw hpa7tmwatli xre7t hjonli

drutta *Narcissus jonquilla* is a BULB growing to 0.3 m (1ft) by 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in April. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although we have no records for this species, many if not all members of this genus are poisonous[K].

kcakta Edible Parts: FlowersEdible Uses: Flowers - raw or candied and made into desserts[183].

tcanta EssentialAn essential oil obtained from the flowers is used in perfumery[61, 100, 171]. 1 kg of flowers yields 1g absolute of essential oil[46].

nrakta Europe - Mediterranean. ksacta Rocky hill-sides, often on limestone[90], also in meadows and damp places[50].

propta Seed - best sown as soon as it is ripe in a cold frame. A short stratification will improve the germination of stored seed. Sow the seed thinly so that the seedlings can be left undisturbed in the pot for their first two years of growth. Give them an occasional liquid feed in the growing season to ensure they do not become nutrient deficient. When the plants become dormant in the summer, pot up the small bulbs placing 2 - 3 bulbs in each pot. Grow them on for another

one or two years in the greenhouse before planting them out when they are dormant in late summer. Division of bulbs after the leaves die down in early summer[1]. Larger bulbs can be replanted immediately into their permanent positions, or can be stored in a cool place and then be planted out in the autumn. It is best to pot up the smaller bulbs and grow them on for a year before planting them out when dormant in the autumn.

nwatta Prefers a deep rather stiff soil but succeeds in most soils[1]. Grows well in heavy clay soils. Easily grown in a dry sunny position[90]. Prefers an alkaline soil with a pH between 7 and 8[200]. A very ornamental plant[1], it is widely cultivated around the Mediterranean for its essential oil[50]. The blooms, which are almost intoxicatingly scented, have an undertone of orange in their perfume[245]. The double form, 'flora Pleno' is even more powerfully scented[245].

5.2.596 *Leucojum aestivum*

Summer Snowflake

4 tlin 9 cyuc 1 kcaak 0 tcan 0 dwat 0.5 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyikfrip hpa7tli prikliw hpa7tmwatli xre7t hjonli

drutta *Leucojum aestivum* is a BULB growing to 0.5 m (1ft 8in) by 0.1 m (0ft 4in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in May, and the seeds ripen in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: RootEdible Uses: Bulb - cooked[105]. I have some reservations about this report, though no records of the plant being poisonous have been found so far.

nrakta Europe, including Britain, from France south and east to Spain, Greece, the Crimea and Iran. ksacta Marshes, wet meadows and willow thickets, avoiding acid soils[17].

propta The seed is best sown as soon as it is ripe in a well-drained soil in a cold frame. Stored seed requires 2 - 3 months cold stratification, it should then germinate in 2 - 4 weeks at 10°c[134]. Sow the seed thinly so that the seedlings can be allowed to grow on undisturbed in the pots for their first year of growth. Give them an occasional weak liquid feed to ensure that they do not become nutrient deficient. Pot up the small bulbs when dormant, planting 2 - 3 bulbs in each pot. Grow them on for another 2 - 3 years before planting them out. Division of offsets in September/October. It is best done as soon as the foliage ripens[1]. Scooping the bulbs.

nwatta Landscape Uses:Border, Container, Foundation, Massing, Rock garden. Specimen, Woodland garden. Easily grown in ordinary garden soil[1]. It does well in a moist heavy soil in full sun or partial shade[1, 17, 31, 90] and is happy in water-logged conditions[90]. The dormant bulbs are fairly hardy and will withstand soil temperatures down to at least -5°c[214]. Plants can be naturalized in damp rough grass[200]. Flowers are produced within 4 - 5 years from seed. The seedpods are swollen and filled with air so that they can be dispersed by floating in water[90]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Special Features:Attractive foliage, Naturalizing, Suitable for cut flowers.

5.2.597 *Polygonum persicaria*

Red Leg, Spotted ladysthumb

4 tlin 8 cyuc 1 kcaak 0 tcan 2 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliw hpa7tmwatli fyfjxre7t hjonli

drutta *Polygonum persicaria* is a ANNUAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to October, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay)

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

pcista Although no specific mention has been made for this species, there have been reports that some members of this genus can cause photosensitivity in susceptible people. Many species also contain oxalic acid (the distinctive lemony flavour of sorrel) - whilst not toxic this substance can bind up other minerals making them unavailable to the body and leading to mineral deficiency. Having said that, a number of common foods such as sorrel and rhubarb contain oxalic acid and the leaves of most members of this genus are nutritious and beneficial to eat in moderate quantities. Cooking the leaves will reduce their content of oxalic acid. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Edible Parts: Leaves SeedEdible Uses: Leaves and young shoots - raw or cooked[55, 62, 105, 183]. They contain about 1.9% fat, 5.4% pectin, 3.2% sugars, 27.6% cellulose, 1% tannin[178]. Seed - raw or cooked. It is rather small and fiddly to utilize.

tcanta DyeA yellow dye is obtained from the plant when alum is used as a mordant[207].

dwatta Astringent Diuretic Lithontripic Poultrice Rubefacient VermifugeThe leaves are astringent, diuretic, rubefacient and vermifuge[9, 21, 53, 178, 222]. An infusion has been used as a treatment for gravel and stomach pains[257]. A decoction of the plant, mixed with flour, has been used as a poultice to help relieve pain[257]. A decoction of the plant has been used as a foot and leg soak in the treatment of rheumatism[257]. The crushed leaves have been rubbed on poison ivy rash[257].

nrakta Temperate regions of the northern hemisphere, including Britain. ksacta Damp shady places[5]. A common weed of cultivated land, avoiding shade[1].

propta Seed - sow spring in situ.

nwatta Succeeds in an ordinary garden soil[1] but prefers a moisture retentive not too fertile soil in sun or part shade[200]. Repays generous treatment[1]. Plants seem to be immune to the predations of rabbits[233].

5.2.598 Scabiosa fischeri

4 tlin 8 cyuc 1 kcaak 0 tcan 0 dwat 0.5 m hkuc hmimhtut cyutli kyuctcup hwicli hrasljutnyik hpa7tli flat-prikliwslip hpa7tmwatli xre7t hjonli

drutta Scabiosa fischeri is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from July to October, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves - cooked[105, 177].

nrakta E. Asia - E. Siberia to Manchuria. ksacta Dry meadows, grass plots in light coniferous forests, steppes, rubbly mountain slopes and riparian sands[74].

propta Seed - sow spring in a cold frame. The seedlings are subject to damping off[1] so water with care and make sure to give adequate ventilation. Prick out the seedlings into individual pots once they are large enough to handle and plant them out into their permanent positions in the summer. Division in spring. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Prefers a neutral or alkaline soil and a sunny position[200]. Succeeds in ordinary garden soil[1]. A very ornamental plant[1]. Members of this genus are rarely if ever troubled by browsing deer[233].

5.2.599 Sedum kamtschaticum

Orange stonecrop, Kamschataka Sedum, Kamschataka Stonecrop

4 tlin 10 cyuc 1 kcaak 0 tcan 2 dwat 0.1 m hkuc htut cyutli hgatkuyctcup hwicli hrasljutnyik hpa7tli flatprikliw hpa7tmwatli fyifxre7t hjonli

drutta Sedum kamtschaticum is an evergreen Perennial growing to 0.1 m (0ft 4in) by 0.3 m (1ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista Although not poisonous, if large quantities of this plant are eaten it can cause a stomach upset[62, 85].

kcakta Edible Parts: LeavesEdible Uses: Young leaves and stems - cooked[105, 177, 179].

tcanta Plants can be grown as a ground cover when planted about 30cm apart each way[208].

dwatta Anodyne Antiphlogistic PoultriceThe whole plant is anodyne and antiphlogistic. It stimulates the circulation[147]. A decoction is used in the treatment of traumatic injuries, bleeding cuts, burns and poisonous snakebites[147]. The fresh plant is crushed and applied externally to cuts, burns, traumatic injuries etc[218].

nrakta E. Asia - Japan to Siberia. ksacta Rocks in mountains all over Japan[58].

propta Seed - surface sow in spring in well-drained soil in a sunny position in a greenhouse. Do not allow the soil to dry out. Prick out the seedlings into individual pots when they are large enough to handle. If sufficient growth is made, it is possible to plant them out during the summer, otherwise keep them in a cold-frame or greenhouse for their first winter and plant them out in early summer of the following year[K]. Division is very easy and can be carried out at almost any time in the growing season, though is probably best done in spring or early summer. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Landscape Uses:Border, Container, Ground cover, Rock garden, Specimen. Succeeds in most soils[188] but prefers a fertile well-drained soil[200]. Requires a sunny position[188, 200]. A very drought tolerant plant once established[190, 200], it can be grown in crevices on walls[219]. Hardy to about -15°C[200]. This species is closely related to *S. hybridum*[1] and *S. aizoon*[200]. All members of this genus are said to have edible leaves, though those species, such as this one, that have yellow flowers can cause stomach upsets if they are eaten in quantity[62, 85]. Plants in this genus seem to be immune to the predations of rabbits[233]. Special Features: Attractive foliage, Not North American native, Naturalizing.

5.2.600 Scutellaria indica

4 tlin 8 cyuc 1 kcaak 0 tcan 1 dwat 0.3 m hkuc htut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikliw hpa7tmwatli xre7t hjonli

drutta Scutellaria indica is a PERENNIAL growing to 0.3 m (1ft) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young plant - cooked[105, 177].

dwatta Used as a folk remedy for traumatic injuries[266].

nrakta E. Asia - China, Japan, Korea. ksacta Sunny hills in C. and S. Japan[58]. Hillsides, grasslands, open rocky ar-

5.2.612 Potentilla erecta

Tormentil, Erect cinquefoil

4 tlin 8 cyuc 1 kcaak 0 tcan 3 dwat 0.3 m hkuc hmimhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikliw hpa7tmwatli fyifxre7t hjonli

drutta Potentilla erecta is a PERENNIAL growing to 0.3 m (1ft) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Gastrointestinal symptoms if doses over 1g. Interferes with iron absorption and other minerals when taken internally. Avoid if inflammatory or ulcerative bowel disease. Avoid if pregnant or lactating [301].

kcakta Edible Parts: RootEdible Uses: TeaThe roots are extremely rich in tannin, long boiling converts this into a gum and it can then be eaten [115]. An emergency food, it is only eaten when all else fails[177]. A tea is made from the rhizomes[183].

tcanta Cosmetic Dye TanninA red dye is obtained from the roots[4, 66, 115]. The plant, and especially the root, is rich in tannin[4, 7]. It is used cosmetically as a compress to tone up flabby skin[7]. The root contains up to 20% tannin[238].

dwatta Antibiotic Antidiarrhoeal Astringent Dysentery Enuresis Haemostatic Hypoglycaemic OdontalgicContaining more tannin than oak bark, all parts of tormentil are strongly astringent, finding use wherever that action is required. This plant is considered to be one of the safest native astringents and it is widely used in herbal medicine in the treatment of diarrhoea, dysentery, sore throats etc[4, 238, 254]. The whole plant, and especially the root, is antibiotic, strongly astringent, haemostatic and hypoglycaemic[4, 7, 9, 21, 165]. It is used in the treatment of diarrhoea, dysentery, irritable bowel syndrome, colitis, ulcerative colitis etc[254]. Externally, the plant makes a good styptic for cuts etc., and a strongly made decoction has been recommended as a wash for mouth ulcers, infected gums, piles and inflamed eyes[4, 254]. Extracts are used to treat chapping of the anus and cracked nipples[7]. The plant's effectiveness as a toothache remedy is undeniable and it has also been of benefit in treating bed-wetting by children[7].

nrakta Europe, including Britain, from Scandinavia south and east to N. Africa, W. Asia, Siberia. ksacta Grassland, heath, bog, fens, mountain tops and open woods[17], especially in light acid soils[165].

propta Seed - sow early spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Easily grown in a well-drained loam, preferring a position in full sun but tolerating shade[1]. Prefers a light acid soil, disliking heavy and strongly calcareous soils[17]. Members of this genus are rarely if ever troubled by browsing deer[233].

5.2.613 Trillium kamtschaticum

4 tlin 8 cyuc 1 kcaak 0 tcan 2 dwat 0.3 m hkuc pcmhmimhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikliw hpa7tmwatli xre7t hjonli

drutta Trillium kamtschaticum is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to July, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil.

Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit[105]. No more details are given.

dwatta MiscellanyThe root contains steroidal saponins, which have hormonal effects on the body[222, 238]. They are being used in gynaecological and obstetric medicine[238].

nrakta E. Asia - Japan, Korea. ksacta Humus-rich soils in woodlands, N. Japan[58, 200]. Forests, forest margins and moist places at elevations of 500 - 1400 metres in Jilin province in China[266].

propta Seed - best sown in a shaded cold frame as soon as it is ripe[134, 200]. Stored seed should be sown in late winter or early spring. Seed usually germinates within 1 - 3 months at 15°C. Another report says that seeds produce a root after the first cold stratification but no shoot is produced until after a second winter[138], whilst yet another report says that the seed can take 3 years to germinate[238]. The seedlings are prone to damp off and must therefore be watered with care and given plenty of fresh air[138]. The young plants need to be overwintered in a cold frame for the first year and can then be planted out in late spring. It is very important that the pots become neither too dry nor too wet[138]. Division with care when the plants die down after flowering[200]. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the following spring.

nwatta Prefers a deep well-drained woodland or humus-rich soil in a somewhat shady position that remains moist in the summer[1, 42]. Prefers a neutral to slightly acid soil[200]. Grows well in open woodland[1]. Succeeds in deep shade[188]. Succeeds in a sunny position if the soil does not dry out[42]. Any transplanting is best done whilst the plants are in flower[200]. Plants can flower in two years from seed[138]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233], though slugs are very fond of the leaves[238].

5.2.614 Trillium smallii

4 tlin 8 cyuc 1 kcaak 0 tcan 0 dwat 0.4 m hkuc pcmhmimhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikliw hpa7tmwatli xre7t hjonli

drutta Trillium smallii is a PERENNIAL growing to 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit[58, 105, 177]. No more details are given.

nrakta E. Asia - Japan. ksacta Woods in foothills all over Japan[58]. Also found in grassy places in mountains and occasionally in stony places by the sea[42].

propta Seed - best sown in a shaded cold frame as soon as it is ripe[134, 200]. Stored seed should be sown in late winter or early spring. Seed usually germinates within 1 - 3 months at 15°C. Another report says that seeds produce a root after the first cold stratification but no shoot is produced until after a second winter[138], whilst yet another report says that the seed can take 3 years to germinate[238]. The seedlings are prone to damp off and must therefore be watered with care and given plenty of fresh air[138]. The young plants need to be overwintered in a cold frame for the first year and can then be planted out in late spring. It is very important that the pots become neither too dry nor too wet[138]. Division with care when the plants die down after flowering[200]. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the following spring.

nwatta Prefers a deep well-drained woodland or humus-rich soil in a somewhat shady position that remains moist in the summer[1, 42]. Prefers a neutral to slightly acid

htut cyutli hgatkycutcup hwicli hyishras]lutnyik hpa7tli flat-priklwis hpa7tmwatli xre7t hjonli

drutia *Artemisia glacialis* is a PERENNIAL growing to 0.2 m (0ft 8in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista Although no reports of toxicity have been seen for this species, skin contact with some members of this genus can cause dermatitis or other allergic reactions in some people[222].

kcakta Edible Parts: Edible Uses: CondimentThe herb is used as a flavouring in vermouth and liqueurs[183].

dwatta Digestive Expectorant Sedative StomachicGlacier wormwood has similar medicinal properties to common wormwood, *A. absinthum*[7]. It is used locally where it grows wild. The whole plant is digestive, expectorant, sedative and stomachic[7]. An infusion of the herb has a marked effect upon mountain sickness[7]. A poultice of the plant is used as a first-aid remedy in the treatment of wounds[7].

nrakta C. Europe. ksacta Exposed rocky slopes in the Alps[190]. Schistose rocks and screes, 2000 - 3100 metres[50].

propta Seed - surface sow from late winter to early summer in a greenhouse, making sure that the compost does not dry out[200]. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant out in late spring or early summer. Division in spring or autumn[200]. Basal cuttings in late spring. Harvest the young shoots when about10 - 15cm long, pot up in a lightly shaded position in a greenhouse or cold frame and plant them out when well rooted. Very easy.

nwatta Requires a very well-drained light or medium soil and a sunny position[190]. Very intolerant of winter wet[190]. Established plants are drought tolerant[190]. Plants are longer lived, more hardy and more aromatic when they are grown in a poor dry soil[245]. Indiscriminate collection of this plant from the wild has made it an endangered species[7]. Members of this genus are rarely if ever troubled by browsing deer[233].

5.2.610 Centaurea nigra

Black Knapweed, Lesser knapweed

4 tin 8 cyuc 1 kcaak 0 tcan 2 dwat 0.6 m hkuc

htut cyutli hgatkycutcup hwicli hyishras]lutnyik hpa7tli flat-priklwisslip hpa7tmwatli fyifxre7t hjonli

drutia *Centaurea nigra* is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: FlowersEdible Uses: Flower petals - raw. Added to salads[183].

dwatta Diaphoretic Diuretic TonicThe roots and seeds are diaphoretic, diuretic, tonic and vulnerary[4, 61]. The plant once had a very high reputation as a healer of wounds[4].

nrakta Western Europe, including Britain, from Spain to Norway, east to Germany and Switzerland. ksacta Grassland, waysides, cliffs etc to 600 metres[17].

propta Seed - sow April in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in the summer. Division in autumn. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant

them out in the summer or following spring. This should be done at least once every three years in order to maintain the vigour of the plant. Basal cuttings in spring. Harvest the shoots when they are about 10 - 15cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Succeeds in ordinary garden soil[1, 200]. Prefers a well-drained fertile soil and a sunny position[200]. Tolerates dry, low fertility and alkaline soils[200]. Established plants are tolerant of considerable neglect, thriving and even self-sowing in dense weed growth[K]. Members of this genus are rarely if ever troubled by browsing deer[233].

5.2.611 Hosta sieboldii

4 tin 8 cyuc 1 kcaak 0 tcan 0 dwat 0.5 m hkuc

hmimhtut cyutli kyuctcup hwicli hras]lutnyikfrip hpa7tli flat-priklwis hpa7tmwatli xre7t hjonli

drutia *Hosta sieboldii* is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from August to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Leaves StemEdible Uses: Young leaves and leaf stems - cooked[105, 177]. Not very tasty[116].

tcanta Suitable for ground cover, the plants should be spaced about 35cm apart each way[208].

nrakta E. Asia - Japan. ksacta Lowland moors and meadows, usually fully exposed to the sun[251].

propta Seed - sow spring in a lightly shaded position in a greenhouse and only just cover the seed. Germination usually takes place within 1 - 3 months at 10°C. Make sure you keep the compost moist. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division is possible at almost any time of the year so long as there is sufficient moisture[233]. It is best carried out in March as growth commences or in early autumn if the soil is not too dry[200]. Hostas can be left undivided for many years and should not be divided any more frequently than once every 3 - 5 years to allow the leaves to reach maturity[200].

nwatta Thrives in most fertile soils if they are rich in humus[200]. Grows well in heavy clay soils and in sandy ones[208]. Very limy soils inhibit growth, but plants can thrive in such a situation if plenty of humus is added[208]. Prefers a pH between 6 and 7[200]. Requires a rich soil that does not dry out readily[1]. This species tolerates drishy conditions[121]. Succeeds in full sun as well as in deep shade, growing well in the semi-shade of a woodland[200, 233]. In general, the sunnier the position the moister the soil should be[233]. Plants are best not grown under trees in town gardens since the soot washed from the leaves of the trees in wet weather will tend to remain on the hosta[208]. Plants flower better when grown in a sunny position but the foliage is better when the plant is in a shady position[200]. The leaves turn yellowish when the plant is grown in full sun[121]. Plants are in general fully hardy in Britain, but young leaves in spring can be destroyed by frost. New leaves are only produced in the spring and very early summer, so any damage at this time has a deep effect on the plant[233]. Forming medium-sized clumps, the rhizome is short and creeping[200]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Plants are very attractive to slugs and snails, the young shoots in spring are especially at risk[111, K]. There are some named forms, selected for their ornamental value[187]. Hybridizes freely with other members of this genus[200].

eas, roadsides and sparse forests at elevations up to 1500 metres[266].

propta Seed - sow in situ outdoors in late spring. If there is only a small quantity of seed it is better to sow it in a pot in a cold frame in early spring. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the spring. Division in spring just before new growth begins. Very easy, larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer. Basal cuttings in early summer in a frame. Very easy. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Succeeds in a sunny position in any ordinary garden soil that does not dry out during the growing season[200]. This species grows well in a rock garden[188].

5.2.601 Potentilla rupestris

Rock Cinquefoil

4 tin 8 cyuc 1 kcaak 0 tcan 0 dwat 0.5 m hkuc

hmimhtut cyutli kyuctcup hwicli hras]lutnyik hpa7tli flat-priklwis hpa7tmwatli fyifxre7t hjonli

drutia *Potentilla rupestris* is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Edible Uses: TeaThe leaves are used as a tea[2, 46, 61, 183].

nrakta Europe, including Britain, from Scandinavia south and east to Spain, W. and C. Asia. ksacta Basic rocks[17] and woody slopes in mountains[100]. Dry sunny rocky slopes in the mountains[187].

propta Seed - sow early spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Easily grown in a well-drained loam, preferring a position in full sun but tolerating shade[1]. Prefers an alkaline soil but tolerates a slightly acid soil[200]. Succeeds in dry soils in the wild[187]. Hardy to about -25°C[187]. Members of this genus are rarely if ever troubled by browsing deer[233].

5.2.602 Cystopteris bulbifera

Berry Bladder Fern, Bulblet bladderfern

4 tin 8 cyuc 1 kcaak 0 tcan 0 dwat 0.2 m hkuc

pcimhmim cyutli tcup hwicli hras]lutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutia *Cystopteris bulbifera* is a deciduous Fern growing to 0.2 m (0ft 8in) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. The seeds ripen from August to October. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

pcista Although we have found no reports of toxicity for this species, a number of ferns contain carcinogens so some caution is advisable[200]. Many ferns also contain thiaminase, an enzyme that robs the body of its vitamin B complex.

In small quantities this enzyme will do no harm to people eating an adequate diet that is rich in vitamin B, though large quantities can cause severe health problems. The enzyme is destroyed by heat or thorough drying, so cooking the plant will remove the thiaminase[172].

kcakta Edible Parts: RootEdible Uses: Root. An emergency food, it is only used when all else fails[172].

tcanta A good ground cover plant[200]. Forming a slowly spreading clump, it should be planted 30cm apart each way[208].

nrakta Eastern N. America - Newfoundland to Manitoba, Wisconsin and Iowa, south to Georgia and Arkansas. ksacta Shaded ravines, cracks and ledges on cliffs, rarely terrestrial; usually on calcareous substrates from sea level to 2500 metres[43, 270].

propta Spores - best sown as soon as ripe on the surface of a humus-rich sterilized soil. Keep the compost moist, preferably by putting a plastic bag over the pot. Germinates in 1 - 3 months at 20°C[164].Pot on small clumps of plantlets as soon as they are large enough to handle and keep humid until they are well established. Do not plant outside until the ferns are at least 2 years old. Division in spring. Bulbils are produced at intervals along the midrib and these can be planted into pots as soon as they are ripe[188, 219].

nwatta Prefers a shady position in a moist but well-drained soil, succeeding in most soil types[200]. Plants can tolerate up to 4 hours direct sun per day[200]. Prefers a pH between 6.5 and 7, but tolerates a range from 5.5 to 7.5[200]. Plants can be grown on old mortared walls if they are in a shady position[219]. Members of this genus are rarely if ever troubled by browsing deer[233]. Plants die back early in dry seasons[200]. This plant produces bulbils on the leaves, these fall off when mature and grow into new plants[200, 235]. In this way the plant can become invasive[200].

5.2.603 Mertensia oblongifolia

Oblongleaf bluebells

4 tin 8 cyuc 1 kcaak 0 tcan 0 dwat 0.3 m hkuc

hmimhtut cyutli tcuphja7n hwicli hras]lutnyik hpa7tli flat-priklwis hpa7tmwatli xre7t hjonli

drutia *Mertensia oblongifolia* is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 4. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: FlowersLeavesEdible Uses: Flowers - raw[172]. Leaves - raw or cooked[172]. The leaves are rather hairy and are not so nice when eaten raw[172].

nrakta Western N. America. ksacta Open slopes and drier meadows, often amongst sagebrush, from the plains and foothills to moderate elevations in the mountains, occasionally to the alpine zone[60].

propta Seed - best sown in a cold frame as soon as it is ripe[1, 200]. Sow stored seed as early in the year as possible. Protect from direct sunlight[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division, with care, in early spring or autumn[200].

nwatta Succeeds in an ordinary garden soil with some shade[1, 111]. A rather difficult plant to grow, it is best in a moist position[1].

5.2.604 Astilbe chinensis

Pumila Spirea,Chinese Astilbe

4 tin 8 cyuc 1 kcaak 3 tcan 0 dwat 0.7 m hkuc

hmim cyutli tcuphja7n hwicli hras]lutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutia *Astilbe chinensis* is a PERENNIAL growing to 0.7 m (2ft 4in) by 0.5 m (1ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils.

It can grow in semi-shade (light woodland). It prefers moist or wet soil.

kcakta Edible Parts: LeavesEdible Uses: Young shoots[177]. No more details are given.

tcanta Landscape Uses: Border, Container, Massing, Rock garden, Woodland garden. There are some named varieties, selected for their ornamental value[233]. A first class ground cover plant, the lower-growing cultivar 'Pumila' is particularly recommended[233]. Special Features:Attractive foliage, Suitable for dried flowers. Dynamic accumulator.

nrakta E. Asia - E. China, Japan, Korea. ksacta Damp woods and along shady streams[187]. Open broad-leaved forests, forest edges and amongst shrubs[74]. Forests, forest margins, meadows, valleys and riversides, 400 - 3600 metres[266].

propta Seed - we have no details for this species but suggest sowing the seed in a greenhouse in early spring. Only just cover the seed. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame until they are at least 20cm tall. Plant them out in the summer, or late in the following autumn. Division in spring. This is best done every 3 - 4 years in order to maintain the vigour of the plant[200]. Larger divisions can be planted straight into their permanent positions whilst smaller clumps are best potted up and kept in a cold frame until they are growing away well.

nwatta Prefers a rich garden soil, but succeeds in most soils so long as they stay reliably moist in the summer[1, 233]. Requires a wet or moist peaty soil in sun or partial shade[187], growing well under shrubs[233]. Prefers a pH in the range 5.5 to 7[200]. Prefers partial shade[200], especially if the soil is on the dry side[233]. Plants are hardy to about -20°C[187]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. There are some named varieties, selected for their ornamental value[233].

5.2.605 *Trillium grandiflorum*

White Trillium, Large Flower Trillium, White Trillium, Large Flower Wakerobin, Large Flowered Tril

4 tlin 9 cyuc 1 kcaak 0 tcan 2 dwat 0.4 m hkuc

pcimhmimhtut cyutli tcup hwicli hraslutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Trillium grandiflorum is a PERENNIAL growing to 0.4 m (1ft 4in) by 0.3 m (1ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young leaves - cooked and used like spinach[46, 61, 105, 183]. A famine food, it is only used when all else fails[177].

dwatta Antispasmodic Diuretic Emmenagogue OphthalmicThe root is diuretic[257]. The raw root is grated and applied as a poultice to the eye in order to reduce swelling[207, 213]. The raw root s also used as a poultice on aching rheumatic joints[257]. A decoction of the root bark can be used as drops in treating a sore ear[257]. The grated root is steeped in water and drunk as a tea for the treatment of cramps[207]. The grated root is simmered in water and drunk for the treatment of irregular menses[207, 213].

nrakta Eastern N. America - Maine to Ontario, south to Georgia and Arkansas. ksacta Rich woods and thickets, usually on limestone[43]. Rich deciduous or mixed coniferous-deciduous upland woods, floodplains, roadsides at elevations of 20 - 700 metres[270].

propta Seed - best sown in a shaded cold frame as soon as it is ripe[134, 200]. Stored seed should be sown in late winter or early spring. Seed usually germinates within 1 - 3 months at 15°C. Another report says that seeds produce a root after the first cold stratification but no shoot is produced until after a second winter[138], whilst yet another report says that the seed can take 3 years to germinate[238]. The seedlings are prone to damp off and must therefore be watered with care and given plenty of fresh air[138]. The young plants need to be overwintered in a cold frame for the first year and can then be planted out in late spring. It is

very important that the pots become neither too dry nor too wet[138]. Division with care when the plants die down after flowering[200]. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the following spring.

nwatta Landscape Uses:Border, Ground cover, Woodland garden. Prefers a deep well-drained woodland or humus-rich soil in a somewhat shady position that remains moist in the summer[1, 42]. Prefers a neutral to slightly acid soil but succeeds in acid or limey soils[200]. Grows well in open woodland[1, 90]. Succeeds in deep shade[188]. Succeeds in a sunny position if the soil does not dry out[42, 138]. A very ornamental and long-lived plant[1, 138, 233]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233], though slugs are very fond of the leaves[238]. A polymorphic species, it is very subject to mutation[90]. Some named varieties have been selected for their ornamental value[200]. Any transplanting is best done whilst the plants are in flower[200]. Plants can flower in two years from seed[138]. Special Features: Attractive foliage, North American native, Naturalizing, Attracts butterflies. The plant is heat tolerant in zones 7 through 3. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. Ephemeral emerging in spring and dying back by summer every year [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

5.2.606 *Gentiana punctata*

Spotted Gentian

4 tlin 8 cyuc 1 kcaak 0 tcan 3 dwat 0.6 m hkuc

hmimhtut cyutli tcup hwicli hraslutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Gentiana punctata is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bumblebees, butterflies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta The root is sometimes used in the manufacture of gentian bitters[183].

dwatta Anthelmintic Antiinflammatory Antiseptic Bitter Cholagogue Emmenagogue Febrifuge Refrigerant Stomachic TonicThis species is one of several that are the source of the medicinal gentian root[4], the thick rootstock can be up to 1 metre long[239]. The following notes are based on the general uses of *G. lutea* which is the most commonly used species in the West[K]. Gentian root has a long history of use as a herbal bitter in the treatment of digestive disorders and is an ingredient of many proprietary medicines. It contains some of the most bitter compounds known and is used as a scientific basis for measuring bitterness[238]. It is especially useful in states of exhaustion from chronic disease and in all cases of debility, weakness of the digestive system and lack of appetite[4]. It is one of the best strengtheners of the human system, stimulating the liver, gall bladder and digestive system[238], and is an excellent tonic to combine with a purgative in order to prevent its debilitating effects[4]. The root is anthelmintic, anti-inflammatory, antiseptic, bitter tonic, cholagogue, emmenagogue, febrifuge, refrigerant, stomachic[4, 7, 9, 14, 21, 165, 238]. It is taken internally in the treatment of liver complaints, indigestion, gastric infections and anorexia[238]. It should not be prescribed for

patients with gastric or duodenal ulcers[238]. The root is harvested in the autumn and dried for later use[4]. It is quite likely that the roots of plants that have not flowered are the richest in medicinal properties[4].

nrakta S. Europe. ksacta Stony pastures, the grassy bottoms of mountain corries, scree and moraines, among rhododendrons and in conifer woods, on both limestone and igneous rocks[239].

propta Seed - best sown as soon as it is ripe in a light position in a cold frame[200]. It can also be sown in late winter or early spring but the seed germinates best if given a period of cold stratification and quickly loses viability when stored, with older seed germinating slowly and erratically[200, 239]. It is advantageous to keep the seed at about 10°C for a few days after sowing, to enable the seed to imbibe moisture[239]. Following this with a period of at least 5 - 6 weeks with temperatures falling to between 0 and -5°C will usually produce reasonable germination[239]. It is best to use clay pots, since plastic ones do not drain so freely and the moister conditions encourage the growth of moss, which will prevent germination of the seed[239]. The seed should be surface-sown, or only covered with a very light dressing of compost. The seed requires dark for germination, so the pots should be covered with something like newspaper or be kept in the dark[239]. Pot up the seedlings into individual pots as soon as they are large enough to handle and grow on in light shade in the greenhouse for at least their first winter. The seedlings grow on very slowly, taking 2 - 7 years to reach flowering size[239]. When the plants are of sufficient size, place them out into their permanent positions in late spring or early summer. Division in March[111]. Most members of this genus have either a single tap-root, or a compact root system united in a single root head, and are thus unsuitable for division[239]. Cuttings of basal shoots in late spring[238].

nwatta In general, gentians require a moist well-drained soil in a sheltered position, a certain minimum of atmospheric humidity, high light intensity but a site where temperatures are not too high[239]. They are therefore more difficult to grow in areas with hot summers and in such a region they appreciate some protection from the strongest sunlight[200, 239]. Most species will grow well in the rock garden[200]. This species is not particular about soil type, so long as it is deep enough to accommodate the plant's roots[239]. A moisture loving plant, preferring to grow with full exposure to the sun but with plenty of underground moisture in the summer, it grows better in the north and west of Britain[1]. Plants are intolerant of root disturbance[200].

5.2.607 *Iris sibirica*

Siberian Iris

4 tlin 9 cyuc 1 kcaak 0 tcan 1 dwat 0.6 m hkuc

hmimhtut cyutli tcuphja7n hwicli hraslutnyikfrip hpa7tli flatprikliwis hpa7tmwatli fyixre7t hjonli

drutta Iris sibirica is a PERENNIAL growing to 0.6 m (2ft) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in June, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

pcista Many plants in this genus are thought to be poisonous if ingested, so caution is advised[65]. The roots are especially likely to be toxic[238]. Plants can cause skin irritations and allergies in some people[238].

kcakta Edible Parts: RootEdible Uses: Root - an edible starch is said to be extracted from it[2, 105, 177]. The root is not eaten in China[178]. Some caution is advised since there are reports that the plant might be poisonous. Perhaps the extracted starch is edible.

tcanta InsecticideAn insecticide is obtained from the plant[178]. (from the root?)

dwatta ExpectorantExpectorant[178].

nrakta C. Europe to Russia. ksacta Damp woodland[50], pastures and heaths[100].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed should be sown as early in the year as

possible in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse or cold frame for their first year. Plant out into their permanent positions in late spring or early summer. Division, best done in August/September after flowering but can also be done in April. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Landscape Uses:Border, Container, Foundation, Massing, Specimen, Woodland garden. Prefers a humus-rich soil[79], succeeding in a moist border or by water[42, 79]. Grows well in heavy clay soils. The plants are very cold tolerant, but they can be damaged when dormant if the soil is too moist[79]. A very ornamental plant, there are many named varieties[187]. Plant the roots out very shallowly[79]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Special Features: Attractive foliage, Not North American native, Naturalizing, All or parts of this plant are poisonous, Wetlands plant, Suitable for cut flowers.

5.2.608 *Ophioglossum vulgatum*

Adder's Tongue, Southern addertongue

4 tlin 8 cyuc 1 kcaak 0 tcan 2 dwat 0.3 m hkuc

htut cyutli tcup hwicli hraslutnyik hpa7tli flatprikliwis hpa7tmwatli hjonli

drutta Ophioglossum vulgatum is a FERN growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5. The seeds ripen from May to August. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista Although we have found no reports of toxicity for this species, a number of ferns contain carcinogens so some caution is advisable[200]. Many ferns also contain thiaminase, an enzyme that robs the body of its vitamin B complex. In small quantities this enzyme will do no harm to people eating an adequate diet that is rich in vitamin B, though large quantities can cause severe health problems. The enzyme is destroyed by heat or thorough drying, so cooking the plant will remove the thiaminase[172].

kcakta Edible Parts: LeavesEdible Uses: Used as a vegetable[145]. No more details are given.

dwatta Emetic Skin VulneryThe root and the leaves are antiseptic, detergent, emetic, haemostatic, styptic and vulnerary[4, 61, 218]. An ointment made from the plant is considered to be a good remedy for wounds and is also used in the treatment of skin ulcers[4, 145]. The expressed juice of the leaves is drunk as a treatment for internal bleeding and bruising[4].

nrakta Europe, including Britain, from Iceland south and east to N. Africa, north and west Asia. ksacta Damp grassland, fens and scrub[17].

propta Spores - best sown as soon as they are ripe on the surface of a humus-rich sterilized soil. Keep the compost moist, preferably by putting a plastic bag over the pot. Pot on small clumps of plantlets as soon as they are large enough to handle and keep them in humid conditions until they are well established. Do not plant outside until the ferns are at least 2 years old. Division of underground rhizomes with care because the roots are brittle[200].

nwatta Prefers a moist free-draining soil[1]. Plants are hardy to about -15°C[200]. The prothalli (a small plant formed when the spore germinates) of this species form a symbiotic relationship with a mycorrhizal fungus in much the same way as orchid seedlings[200]. Members of this genus are rarely if ever troubled by browsing deer[233]. Plants can be hard to establish, they can be naturalized in a meadow or cultivated in the border where they should be left undisturbed[200]. Unlike most species of ferns, the fronds of this species grow up straight and not curled inward, crozier fashion[4].

5.2.609 *Artemisia glacialis*

Glacier Wormwood

4 tlin 8 cyuc 1 kcaak 0 tcan 2 dwat 0.2 m hkuc

clumps of plantlets as soon as they are large enough to handle and keep them humid until they are well established. Do not plant outside until the ferns are at least 2 years old and then only in a very well sheltered position. Division in spring or autumn.

nwatta Landscape Uses:Container, Foundation, Ground cover, Massing, Rock garden, Woodland garden. Easily grown in a cool moist shady position[1, 187]. Requires an abundance of moisture in the air and soil[1]. Prefers an alkaline soil[200]. Requires an acid soil according to another report. A very ornamental plant[1], it does not always succeed outdoors in Britain[1]. It probably prefers to be covered in snow overwinter - could a mulch help[1]? This species is often divided into three separate species by botanists - the type species is found in eastern N. America, A. aleuticum is found in western N. America and a third species is found in eastern Asia[270]. Members of this genus are rarely if ever troubled by browsing deer[233]. Plants have a slowly-increasing rootstock[233]. Special Features:Attractive foliage, North American native, Naturalizing, Wetlands plant, There are no flowers or blooms. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

5.2.738 *Cyripedium calceolus parviflorum*

Nerve Root
4 tin 8 cyuc 0 kcak 0 tcan 3 dwat 0.6 m hkuc
hmimhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta *Cyripedium calceolus parviflorum* is a PERENNIAL growing to 0.6 m (2ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Contact with the fresh plant can cause dermatitis in sensitive people[1, 21].

dwatta Antidiarrhoeal Antispasmodic Diaphoretic Hypnotic Nervine Sedative TonicNerve root has a high reputation for its effect on the nervous system[238]. The root is a pungent bitter-sweet herb with an unpleasant odour, it is antispasmodic, diaphoretic, hypnotic, nervine, sedative, tonic[21, 46, 165, 192, 222, 238]. It is taken internally in the treatment of anxiety, nervous tension, insomnia, depression and tension headaches[238]. The active ingredients are not water soluble and so the root is best taken in the form of a tincture[222]. The plant is said to be the equivalent of Valerian (*Valeriana officinalis*) in its effect as a nervine and sedative, though it is less powerful[1, 4]. The roots are harvested in the autumn and are dried for later use[238]. In the interests of conservation, it is best not to use this herb unless you can be certain it was obtained from a cultivated source - see the notes above under cultivation details[K].

nrakta South-eastern N. America. ksacta Swamps and bogs. Mesic to dry deciduous and deciduous-hemlock forests, usually on slopes; mostly at elevations of 0 - 1200 metres[270].

propta Seed - surface sow, preferably as soon as it is ripe, in the greenhouse and do not allow the compost to dry out. The seed of this species is extremely simple, it has a minute embryo surrounded by a single layer of protective

cells. It contains very little food reserves and depends upon a symbiotic relationship with a species of soil-dwelling fungus. The fungal hyphae invade the seed and enter the cells of the embryo. The orchid soon begins to digest the fungal tissue and this acts as a food supply for the plant until it is able to obtain nutrients from decaying material in the soil[200]. It is best to use some of the soil that is growing around established plants in order to introduce the fungus, or to sow the seed around a plant of the same species and allow the seedlings to grow on until they are large enough to move. Division with care in early spring, the plants resent disturbance[200]. Remove part of the original rootball with the soil intact[200]. Division is best carried out towards the end of the growing season, since food reserves are fairly evenly distributed through the rhizome[230]. Small divisions of a lead and two buds, or divisions from the back (older) part of the rhizome without any developed buds, establish quickly using this method[230]. Replant immediately in situ[230].

nwatta Succeeds in shade or full sun so long as there is adequate moisture[42]. Grows well in a woodland garden[230]. Plants are best grown on a north or north-west aspect in order to slow down early growth[11]. Requires a humus rich soil with plenty of moisture in the growing season[42], it also succeeds in chalky soils[200]. Must not be planted too deeply[42]. A very ornamental plant[1] it is long-lived when once established, though it is very difficult to establish a plant[233]. The flowers have a soft, rose-like perfume[245]. Plants are growing very well at the Savill Gardens in Windsor[233]. This plant is becoming very rare in the wild due to overcollecting for medicinal usage[238]. Reports that the plant is cultivated for its medicinal uses are largely spurious and, unless you can be certain that the root has come from a cultivated source, it is best not to use this plant medicinally but to use suitable substitutes such as *Scutellaria laterifolia* and *Lavendula angustifolia*[238]. Orchids are, in general, shallow-rooting plants of well-drained low-fertility soils. Their symbiotic relationship with a fungus in the soil allows them to obtain sufficient nutrients and be able to compete successfully with other plants. They are very sensitive to the addition of fertilizers or fungicides since these can harm the symbiotic fungus and thus kill the orchid[230].

5.2.739 *Aplectrum hyemale*

Putty Root, Adam and eve
4 tin 8 cyuc 0 kcak 0 tcan 1 dwat 0.5 m hkuc
pcimhmim cyutli tcup hwicli hrasljutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta *Aplectrum hyemale* is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf from October to May, in flower from May to June, and the seeds ripen from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

tcanta AdhesiveA glue can be obtained from the tubers. The roots are bruised with a small addition of water; this gives a strong cement that is used for repairing broken pots, glass etc[207, 230].

dwatta Analgesic Pectoral PoulticeThe roots are macerated to a paste and applied to boils or used to treat head pains[207, 222, 257]. A tea made from the roots has been used in the treatment of bronchial troubles[222]. The roots were given to children by some tribes of native North American Indians in order to endow the children with the gift of eloquence and to make them fat[257].

nrakta Eastern N. America - Quebec to Georgia, west to Minnesota and Arkansas. ksacta Deep shade in the leaf litter of the forest floor[230]. Woods and swamps[235]. Moist, deciduous, upland to swampy forests from sea level to 1200 metres[270].

propta Seed - surface sow, preferably as soon as it is ripe, in the greenhouse and do not allow the compost to dry out. The seed of this species is extremely simple, it has a minute embryo surrounded by a single layer of protective cells. It contains very little food reserves and depends upon a symbiotic relationship with a species of soil-dwelling fungus. The fungal hyphae invade the seed and enter the cells of the

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

nwatta Succeeds in a well-drained loamy soil in a sheltered position[11, 200]. Grows well in heavy clay soils. Dislikes wet soils[200]. Shade tolerant[200]. Hybridizes freely with other members of this genus[50]. Trees are succeeding very well at Kew[11]. Trees are notably susceptible to honey fungus[200].

5.2.653 *Populus 'Balsam Spire'*

Tacatricho 32
4 tin 8 cyuc 0 kcak 2 tcan 3 dwat 30 m hkuc
htut cyutli tcup hwicli hrasljutnyikfrip hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta *Populus 'Balsam Spire'* is a deciduous Tree growing to 30 m (98ft 5in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy (clay) soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

tcanta Pot-pourri Rooting hormone Shelterbelt WoodAn extract of the shoots can be used as a rooting hormone for all types of cuttings. It is extracted by soaking the chopped up shoots in cold water for a day[172]. The dried buds are used in pot-pourri[238]. Wood - soft, rather woolly in texture, without smell or taste, of low flammability, not durable, very resistant to abrasion. Of low quality, it is mainly used as a source of pulp[11, 46].

dwatta Anodyne Antiinflammatory Antiscorbatic Antiseptic Balsamic Diuretic Expectorant Febrifuge Stimulant TonicThe leaf buds are covered with a resinous sap that has a strong turpentine odour and a bitter taste[213]. They also contain salicin. The buds are antiscorbatic, antiseptic, balsamic, diuretic, expectorant, stimulant and tonic[4, 21, 57, 165, 238]. They are taken internally in the treatment of bronchitis and upper respiratory tract infections. They should not be prescribed to patients who are sensitive to aspirin[238]. Externally, the buds are used to treat colds, sinusitis, arthritis, rheumatism, muscular pain and dry skin conditions[238]. They can be put in hot water and used as an inhalant to relieve congested nasal passages[213]. The buds are harvested in the spring before they open and are dried for later use[238]. Although no specific mention has been seen for this species, the bark of most, if not all members of the genus contain salicin, a glycoside that probably decomposes into salicylic acid (aspirin) in the body[213, 238]. The bark is therefore anodyne, anti-inflammatory and febrifuge. It is used especially in treating rheumatism and fevers, and also to relieve the pain of menstrual cramps[238].

nrakta A hybrid, P. balsamifera x P. trichocarpa. ksacta Not known in the wild.

propta Seed - must be sown as soon as it is ripe in spring[113]. Poplar seed has an extremely short period of viability and needs to be sown within a few days of ripening[200]. Surface sow or just lightly cover the seed in trays in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the cold frame. If sufficient growth is made, it might be possible to plant them out in late summer into their permanent positions, otherwise keep them in the cold frame until the following late spring and then plant them out. Most poplar species hybridize freely with each other, so the seed may not come true unless it is collected from the wild in areas with no other poplar species growing[11]. This species is a

hybrid and will not come true from seed. Cuttings of mature wood of the current season's growth, 20 - 40cm long, November/December in a sheltered outdoor bed or direct into their permanent positions. Very easy, the cuttings grow away strongly and can be 2 metres tall by the end of their first year[K]. Suckers in early spring[78].

nwatta An easily grown plant, it grows well in a heavy cold damp soil[1]. It prefers a deep rich well-drained circum-neutral soil, growing best in the south and east of Britain[1, 200]. Growth is much less on wet soils, on poor acid soils and on thin dry soils[11]. Reasonably wind tolerant, though it does not do well in exposed upland sites or in maritime exposure[11, K]. It dislikes shady positions, and is intolerant of root or branch competition[200]. A very fast growing hybrid, this plant is a female clone that is sometimes planted for forestry[11]. It comes into leaf early in the year[11]. Poplars have very extensive and aggressive root systems that can invade and damage drainage systems. Especially when grown on clay soils, they should not be planted within 12 metres of buildings since the root system can damage the building's foundations by drying out the soil[11]. Dioecious. Male and female plants must be grown if seed is required.

5.2.654 *Taxodium distichum*

Swamp Cypress, Bald cypress, Common Bald Cypress
4 tin 10 cyuc 0 kcak 0 tcan 1 dwat 30 m hkuc
hmimhtut cyutli tcuphja7nhs6s hwicli hrasljutnyik hpa7tli flatpriklwissliphsom hpa7tmwatli hjonli

drutta *Taxodium distichum* is a deciduous Tree growing to 30 m (98ft) by 8 m (26ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in April, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline and saline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can grow in water. It can tolerate atmospheric pollution.

tcanta Fibre WoodThe bark has been used to make cordage[257]. Wood - light, soft, not strong, moderately hard, easily worked, straight grained, very durable in damp soil, takes a good polish. It weighs 28lb per cubic foot[227]. The wood is not given to excessive warping or shrinking[227], it is used for construction, water pipes, vats etc[1, 46, 61, 82, 149, 171, 227].

dwatta AnalgesicThe resin in the cones is used as an analgesic for wounds[149, 227].

nrakta South-eastern N. America - New Jersey to Florida and Texas. ksacta Wet sites that are under water for at least part of the year[82], and often overlying calcareous soils[43]. Often found where the water is brackish[200].

propta Seed - sow late winter in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. If sowing a lot of seed you could sow it in early spring in an outdoor seedbed[78]. Allow the plants to grow on in the seedbed for two years and then plant them into their permanent positions in late autumn or early spring. Cuttings in the late summer.

nwatta Landscape Uses:Firewood, Pest tolerant, Massing, Screen, Specimen, Street tree. Although this plant can be grown in wet soils and shallow water, it thrives in any soil and trees actually grow faster in normal unflooded soils[81]. Established plants succeed in standing water up to 60cm deep[200] - in such a situation the roots develop 'knees', curious cone-shaped structures that grow above the ground[227]. Tolerates the high pH of chalk streams[200]. Tolerates atmospheric pollution[200]. Fairly cold-tolerant, but branches can be damaged by temperatures below -10°C[200]. A fairly vigorous tree, it can grow up to 45cm in a year with up to 4cm increase in girth[185]. It has been planted for its timber in S. Europe, especially on alluvial soils[50]. Buds often begin to break in March, but trees do not come properly into leaf until June and growth in height rarely starts before June[185]. A very healthy species in Britain, rarely seen in anything but good health. It seems

to be a very long-lived tree in this country with several specimens more than 250 years old[185]. Trees are thought to live for over 1,000 years in the wild[227]. Plants grow best in areas with warm summers[200]. They only produce fertile seeds after long hot summers[200]. The branches are brittle and subject to wind damage, but the tree usually recovers well[81]. Unlike most conifers, this species responds well to coppicing[81]. Special Features:North American native, Wetlands plant, Attracts butterflies, Inconspicuous flowers or blooms.

5.2.655 Juniperus chinensis

Chinese Juniper, Sargent juniper

4 tin 10 cyuc 0 kcaak 0 tcan 2 dwat 15 m hkuc htut cyutli kyuctup hwicli hrasjlutnyik hpa7tli flatprikli-wisslip hpa7tmwatli nyanhjen hjonli

drutta Juniperus chinensis is an evergreen Tree growing to 15 m (49ft) by 3 m (9ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in leaf all year, in flower in April, and the seeds ripen in October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil.

tcanta Parasiticide ParasiticideA number of cultivars are suitable for use as a ground cover, though they are rather slow-growing[208]. They should be spaced about 90cm apart each way[208]. 'Parsonsii' can grow up to 2 metres across, with its branches horizontal to and about 5cm above the ground but never touching the ground[208].

dwatta Antirheumatic Haemostatic Hepatic Parasiticide Parasiticide ResolventThe stems are used in the treatment of parasitic skin problems and rheumatism[218]. The fruit is used in the treatment of convulsions, excessive sweating and hepatitis[218]. The root is used in the treatment of burns and scalds[218]. The resin, mixed with the resin of Pinus species, is used as a resolvent on tumours[218].

nrakta E. Asia - N.E. China, Japan, Mongolia. ksacta Near seashores in C. and S. Japan[58].

propta The seed requires a period of cold stratification. The seed has a hard seedcoat and can be very slow to germinate, requiring a cold period followed by a warm period and then another cold spell, each of 2 - 3 months duration[78, 81]. Soaking the seed for 3 - 6 seconds in boiling water may speed up the germination process[11]. The seed is best sown as soon as it is ripe in a cold frame. Some might germinate in the following spring, though most will take another year. Another possibility is to harvest the seed 'green' (when the embryo has fully formed but before the seedcoat has hardened). The seedlings can be potted up into individual pots when they are large enough to handle. Grow on in pots until large enough, then plant out in early summer. When stored dry, the seed can remain viable for several years[1]. Cuttings of mature wood, 5 - 10cm with a heel, September/October in a cold frame. Plant out in the following autumn[1, 78]. Layering in September/October. Takes 12 months[78].

nwatta Landscape Uses:Screen. Succeeds in most soils if they are well drained, preferring a neutral or slightly alkaline soil[1, 11, 200]. Succeeds in chalky soils[200]. Established plants are drought tolerant, succeeding in hot dry positions[200]. A slow growing and rather short-lived tree[185]. The plants produce new growth from early May to the end of August and can make 50cm a year increases in height when young[185]. A very ornamental plant[1], there are many named varieties[200]. The crushed foliage has a rather sour resinous scent[185]. Trees are usually dioecious but occasional monoecious trees occur[11]. Male and female flowers are required if fruit and seed is to be produced. Special Features: Fragrant foliage, Not North American native, Inconspicuous flowers or blooms.

5.2.656 Chamaecyparis nootkatensis

Nootka Cypress, Nootka Cypress, Yellow Cypress, Alaska Cedar

4 tin 8 cyuc 0 kcaak 0 tcan 1 dwat 15 m hkuc hmimhtut cyutli kyuctup hwicli hrasjlutnyikfrip hpa7tli flatprikli-wisslip hpa7tmwatli hjonli

drutta Chamaecyparis nootkatensis is an evergreen Tree growing to 15 m (49ft) by 6 m (19ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, in flower from March to April, and the seeds ripen from October to November. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate strong winds but not maritime exposure. It cannot tolerate atmospheric pollution.

tcanta Fibre Hedge Hedge Miscellany Tinder Wood-Plants can be grown as a tall hedge[200] They are very tolerant of clipping so long as this does not extend into the brown barked wood since trees cannot regenerate from this[200]. Any trimming should be done in the summer[200]. The fibre of the inner bark is fine and soft, it is pounded and spun then used for making blankets, clothing, capes, mats etc[99, 226, 257]. Torn into pieces, it can be used as bandages or for washing babies[226]. The finely shredded inner bark can be used as a tinder[257]. Wood - hard, very durable, fragrant with an agreeable resinous odour, close grained, has low-shrinkage, is somewhat brittle, but does not splinter. Easily worked, it is used for carving, cabinet work, making boats, implements etc[1, 46, 61, 82, 99, 171, 226].

dwatta Antirheumatic Miscellany Poutice SkinThe plant has been used in sweat baths for treating rheumatism and arthritis[257]. An infusion of the branch tips has been used as a wash for sores and swellings[257]. A poultice of the crushed leaves has been applied to sores[257]. The soft bark has been used as a cover for poultices[257].

nrakta Western N. America - Alaska to Oregon. ksacta Woodlands from sea-level to 1,000 metres[60, 82]. The best specimens are found in the deep soil of cool wet coastal forests[226].

propta Seed - sow March/April in a seedbed outdoors[78]. The seed is best sown in pots in a frame[K]. Seed can take 18 months to germinate. One month warm then one month cold stratification has produced good results[113]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter, planting them out in late spring after the last expected frosts. Cuttings in late summer or autumn in sandy soil in a cold frame[1, 11, 200]. Difficult, it may be best done in late winter to early spring[113].

nwatta Landscape Uses:Screen. Succeeds in most soils and situations, but prefers a moist deep loamy soil and a sheltered position[1, 11]. Grows well in heavy clay soils. Survives on dry alkaline soils[200]. Does not grow well on peat or shallow chalky soils[11]. Growth of trees is hardly affected by a lack of phosphate in the soil. Plants are moderately shade tolerant, especially when young[81, 200]. Plants are tolerant of atmospheric pollution according to one report[200], whilst another says that they do not do well in a polluted atmosphere[1]. Plants are hardy to about -35c, they also tolerate low summer temperatures[200]. A very polymorphic species, there are many named varieties[200]. This species establishes well and grows fairly quickly when young[11]. Trees can reach 20 metres tall in 35 years but growth slows as the trees get older[185]. It is cultivated as a timber tree in Europe[50]. Trees in the wild can live for 1,000 years or longer[226], one specimen is believed to be 3,500 years old[229]. This longevity is probably due to the presence of toxic chemical compounds from microscopic fungi concentrated in the heartwood[226]. The wood and foliage have an acrid odour[226]. The bruised foliage releases a smell of turpentine[245]. Favoured by many birds for roosting, high cover and especially for nesting, large specimens of this tree help to attract songbirds to the garden[200]. Trees are notably susceptible to honey fungus[200]. Special Features:North American native, Inconspicuous flowers or blooms.

shade in the greenhouse for at least their first winter. The seedlings grow on very slowly, taking 2 - 7 years to reach flowering size[239]. When the plants are of sufficient size, place them out into their permanent positions in late spring or early summer. Division in March[111]. Most members of this genus have either a single tap-root, or a compact root system united in a single root head, and are thus unsuitable for division[239]. Cuttings of basal shoots in late spring[238].

nwatta In general, gentians require a moist well-drained soil in a sheltered position, a certain minimum of atmospheric humidity, high light intensity but a site where temperatures are not too high[239]. They are therefore more difficult to grow in areas with hot summers and in such a region they appreciate some protection from the strongest sunlight[200, 239]. Most species will grow well in the rock garden[200]. This is an easily grown species[239]. A moisture loving plant, preferring to grow with full exposure to the sun but with plenty of underground moisture in the summer, it grows better in the north and west of Britain[1]. Plants are intolerant of root disturbance[200].

5.2.735 Anthemis tinctoria

Yellow Camomile, Golden chamomile, Dyers' Chamomile, Golden Marguerite

4 tin 6 cyuc 0 kcaak 0 tcan 1 dwat 0.8 m hkuc htut cyutli kyuctup hwicli hrasjlutnyik hpa7tli prikli-wisslip hpa7tmwatli fyfxre7t hjonli

drutta Anthemis tinctoria is an evergreen Perennial growing to 0.8 m (2ft 7in) by 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf all year, in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies), flies, beetles. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

tcanta DyeA distinctive yellow dye is obtained from the flowers[14, 17, 46, 61, 89, 169, 244].

dwatta Antispasmodic Emmenagogue VesicantThe whole plant is antispasmodic, diaphoretic, emetic, emmenagogue and vesicant[4]. It is used internally as a tea, which can be made either from the flowers or the whole plant[4]. Applied externally, it is used as a poultice on piles and can also be applied to the bath water[4]. The leaves are rubbed onto insect stings[222].

nrakta Europe - Mediterranean. A casual in Britain[17]. ksacta Sunny slopes, rocks, railway tracks and walls, usually on limestone[89].

propta Seed - surface sow March/April in a greenhouse[134]. Do not allow the soil to dry out. Light aids germination. The seed usually germinates in 2 weeks at 20°C[134]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in the summer. Cuttings of soft wood early summer in a frame. Very easy[K]. Division in spring or autumn[200].

nwatta Landscape Uses:Border, Container, Massing, Seashore. Prefers a well-drained sweet soil and a sunny position[1]. Grows well on chalk[187]. Plants succeed in maritime gardens[233]. Hardy to about -15°C[200]. Another report says that it is hardy to about -25°C[187]. This species has formerly been cultivated as a dye plant[61], the var. 'Kel-away' is said to be the best form[169]. Plants are apt to over-flower and exhaust themselves. It is best to remove the flowering stems as soon as they stop flowering in order to stimulate the production of basal shoots for the following year[233]. Special Features:Attractive foliage, Fragrant foliage, Attracts butterflies, Suitable for cut flowers, Suitable for dried flowers, Extended bloom season in Zones 9A and above, Fragrant flowers, Attractive flowers or blooms.

5.2.736 Ranunculus flammula

Lesser Spearwort, Greater creeping spearwort

4 tin 8 cyuc 0 kcaak 0 tcan 1 dwat 0.6 m hkuc

hmimhtut cyutli tucphja7nhs6s hwicli hrasjlutnyik hpa7tli flatprikli-wisslip hpa7tmwatli fyfxre7t hjonli

drutta Ranunculus flammula is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies, bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can grow in water.

pcista All parts of the plant are poisonous when fresh, the toxins are destroyed by heat or by drying[4, 10, 19, 21, 65]. The plant also has a strongly acrid juice that can cause blistering to the skin[65, 183].

dwatta The whole plant is strongly rubefacient[4]. A tincture of the plant is used to cure ulcers[4].

nrakta Most of Europe, including Britain, to temperate Asia. ksacta Common in wet places throughout Britain[4].

propta Seed - sow spring in situ. This plant does not really need any encouragement. Division in spring. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta A plant of boggy soils and shallow water, it prefers a loamy soil and a sunny position. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

5.2.737 Adiantum pedatum

Northern Maidenhair,American Maidenhair Fern

4 tin 9 cyuc 0 kcaak 2 tcan 2 dwat 0.5 m hkuc hmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikli-wisslip hpa7tmwatli hjonli

drutta Adiantum pedatum is a FERN growing to 0.5 m (1ft 8in) by 0.5 m (1ft 8in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 3. The seeds ripen from August to October. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

pcista Although we have found no reports of toxicity for this species, a number of ferns contain carcinogens so some caution is advisable[200]. Many ferns also contain thiaminase, an enzyme that robs the body of its vitamin B complex. In small quantities this enzyme will do no harm to people eating an adequate diet that is rich in vitamin B, though large quantities can cause severe health problems. The enzyme is destroyed by heat or thorough drying, so cooking the plant will remove the thiaminase[172].

tcanta Basketry Hair LiningThe stipe of the plant is used as an ornament in basketry[172, 157]. The leaves can be used as a lining for carrying or storing fruits in baskets and on racks[257]. The plant is used as a hair conditioner[172]. The stems have been used as a hair wash to make the hair shiny[222]. Plants can be used for ground cover when planted about 30cm apart either way, they form a slowly spreading clump[208].

dwatta Antirheumatic Astringent Demulcent Emmenagogue Expectorant Febrifuge Haemostatic Pectoral TonicThe whole plant is considered to be antirheumatic, astringent, demulcent, emmenagogue, expectorant, febrifuge, haemostatic, pectoral and tonic[172, 222, 240]. A tea or syrup is used in the treatment of nasal congestion, asthma, sore throats etc[222]. A decoction of the root was massaged into rheumatic joints[257]. The N. American Indians chewed the fronds and then applied them to wounds to stop bleeding[213]. A strong infusion of the whole plant was has been used as an emetic in the treatment of ague and fevers[257]. This plant was highly valued as a medicinal plant in the 19th century and merits scientific investigation[222].

nrakta N. America - Alaska to Quebec and Nova Scotia, south to California and Georgia. E. Asia ksacta Rich, deciduous woodlands, often on humus-covered talus slopes and moist lime soils, from sea level to 700 metres[270].

propta Spores - best sown as soon as ripe on the surface of a humus-rich sterilized soil. Keep the compost moist, preferably by putting a plastic bag over the pot. Pot on small

nrakta E. Asia - Himalayas from Pakistan to S. W. China. ksacta Grows in abundance in moist meadows flushed with melt water from snow and glaciers, 4,000 - 5,000 metres[200].

propta Seed - best sown as soon as it is ripe in a cold frame[133]. Sow stored seed in early spring in a cold frame[1]. Germination is inhibited by temperatures above 20°C[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in autumn. This is best done every other year[200].

nwatta Prefers a moist position in partial shade, such as along the edge of a stream or in a woodland garden[200]. In such a position the plant is usually long-lived[200]. If conditions are too dry the plant may become dormant by late summer[200]. Grows well in heavy clay soils. The flowers have a delicious sweet honey perfume[245].

5.2.732 Tephrosia virginiana

Catgut, Virginia tephrosia

4 tin 8 cyuc 0 kcak 0 tcan 2 dwat 0.6 m hkc
htut cyutli hgtakuyctup hwicli hysrasjlnutyik hpa7tli flatprikliws hpa7tmwatli xre7t hjonli

drutta Tephrosia virginiana is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from May to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista Contact with the plant can cause dermatitis in sensitive people[222]. The seeds are toxic[222].

tcanta Hair InsecticideThe root is a source of the insecticide 'rotenone' [207, 213]. This is especially effective against flying insects but appears to be relatively harmless to animals[213]. A decoction of the roots has been used as a hair shampoo by women in order to prevent hair loss[257].

dwatta Antihelmintic Cancer Diaphoretic Diuretic Pectoral Tonic Women's complaintsThe root is antihelmintic, diaphoretic, diuretic, pectoral and tonic[207, 222, 257]. A tea made from the roots is said to make children muscular and strong[222, 257]. A cold tea is used to improve male potency and also to treat TB, bladder problems, coughs, irregular menstruation and other women's complaints[222, 257]. Experimentally, the root has shown both anticancer and cancer-causing activity[222]. The leaves have been placed in the shoes in order to treat fevers and rheumatism[257].

nrakta Eastern N. America - New Hampshire to Florida, west to Texas and Manitoba. ksacta Dry sandy woods and openings[43].

propta Pre-soak the seed for 12 hours in warm water and then sow in a greenhouse in spring. Prick out the seedlings into individual pots when they are large enough to handle and grow on in the greenhouse for their first winter, planting out in the following spring or early summer.

nwatta Industrial Crop: Pesticide Management: Hay Wild CropA deep rooted plant, requiring a dry to moist light or medium very well-drained soil in a sunny position[200]. Plants are hardy to about -25° when given a suitable position[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

5.2.733 Anemone obtusiloba

4 tin 8 cyuc 0 kcak 0 tcan 1 dwat 0.3 m hkc
htut cyutli tcup hwicli hrasjlnutyik hpa7tli flatprikliws hpa7tmwatli fyifxre7t hjonli

drutta Anemone obtusiloba is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy),

medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista All parts of this plant contain protoanemonin, an irritating acid oil that is an enzymatic breakdown product of the glycoside ranunculin. While protoanemonin can cause severe topical and gastrointestinal irritation, it is unstable and changes into harmless anemonin when plants are dried or heated[4, 10, 19, 65, 270].

dwatta Antirheumatic Emetic Ophthalmic Rubefacient-The roots, mixed with milk, are administered internally in the treatment of contusions[240]. They are used externally as a blistering agent[240]. The juice of the root is ophthalmic[272]. The seeds taken internally induce vomiting[211, 240], whilst an oil extracted from them is used in the treatment of rheumatism[211].

nrakta E. Asia - Himalayas from Kashmir to Sikkim. ksacta Moist open slopes, 2000 - 3400 metres in Kashmir[145].

propta Seed - best sown in a cold frame as soon as it is ripe in the summer[1]. Surface sow or only just cover the seed and keep the soil moist. Sow stored seed as soon as possible in late winter or early spring. The seed usually germinates in 1 - 6 months at 15°C[133]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for at least their first year. When the plants are large enough, plant them out in the spring. Division in late summer after the plant dies down, or in early spring.

nwatta Succeeds in ordinary garden soil but prefers a rich sandy loam[1]. Requires a well-drained humus-rich soil in full sun[200]. Requires a warm sheltered position[1]. Plants seem to be immune to the predations of rabbits[233]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54]. This species is very closely related to *A. rupestris*[211].

5.2.734 Gentiana straminea

4 tin 8 cyuc 0 kcak 0 tcan 3 dwat 0.3 m hkc
hmimhtut cyutli tcup hwicli hrasjlnutyik hpa7tli flatprikliws hpa7tmwatli xre7t hjonli

drutta Gentiana straminea is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bumblebees, butterflies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

dwatta Analgesic Antinflammatory Antipyretic Antirheumatic HypotensiveThe roots of gentian species contain some of the most bitter compounds known and make an excellent tonic for the whole digestive system, working especially on the stomach, liver and gall bladder[238]. The root is analgesic, anti-inflammatory, antipyretic, antirheumatic, diuretic, febrifuge, hypoglycaemic and hypotensive[176, 238]. The root is used internally in the treatment of arthritis, allergic inflammations, low-grade fever in chronic diseases, jaundice and hepatitis[176, 238]. The root is harvested in the autumn and dried for later use.

nrakta E. Asia - W. China. ksacta Grassy slopes and alpine meadows to 3,500 metres[239].

propta Seed - best sown as soon as it is ripe in a light position in a cold frame[200]. It can also be sown in late winter or early spring but the seed germinates best if given a period of cold stratification and quickly loses viability when stored, with older seed germinating slowly and erratically[200, 239]. It is advantageous to keep the seed at about 10°C for a few days after sowing, to enable the seed to imbibe moisture[239]. Following this with a period of at least 5 - 6 weeks with temperatures falling to between 0 and -5°C will usually produce reasonable germination[239]. It is best to use clay pots, since plastic ones do not drain so freely and the moister conditions encourage the growth of moss, which will prevent germination of the seed[239]. The seed should be surface-sown, or only covered with a very light dressing of compost. The seed requires dark for germination, so the pots should be covered with something like newspaper or be kept in the dark[239]. Pot up the seedlings into individual pots as soon as they are large enough to handle and grow on in light

5.2.657 Campsis radicans

Trumpet Vine, Trumpet creeper

4 tin 10 cyuc 0 kcak 1 tcan 1 dwat 12 m hkc
htut cyutli tcup hwicli hrasjlnutyik hpa7tli flatprikliws hpa7tmwatli xre7t hjonli

drutta Campsis radicans is a deciduous Climber growing to 12 m (39ft 4in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in leaf from June to October, in flower from August to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista There have been isolated cases reported of people suffering from dermatitis after handling the leaves[274].

tcanta Can be used as a ground cover plant in a sunny position[188]. They can be allowed to scramble on the ground and will form an effective ground cover, rooting at intervals along the branches[208]. They should be planted about 2.5 metres apart each way[208]. The form *C. radicans* f. *flava* has gained the Royal Horticultural Society's Award of Garden Merit.

dwatta Diaphoretic VulneraryThe root is diaphoretic and vulnerary[61, 218].

nrakta Southeast N. America - Florida to Texas and north to New Jersey and Michigan.. ksacta Low woods and thickets[43]. An aggressive weed of arable fields[200].

propta Seed - sow spring in a greenhouse at 10°C. Two months stratification at 5°C assists germination[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of almost ripe wood, 7 - 10cm long, July/August in a frame. Slow to root but a fair percentage[78, 200]. Root cuttings 5cm long in December. Fair to good percentage[78]. Suckers, removed in the dormant season.

nwatta Landscape Uses:Arbor, Seashore, Woodland garden. Succeeds on a warm wall in a good loamy soil[1] in full sun[166] or light shade[200]. Plants can become rampant when growing in rich soils[200]. A very ornamental plant[1], it is hardy to about -20°C according to some reports[184, 200] whilst another says that it is not hardy in all parts of the country but it succeeds in more open positions such as a pergola or an old tree in the southern part of England[1]. Plants require the extra warmth of a sunny wall to induce better flowering[184]. Plants are self-clinging by aerial roots like ivy but are best if given some support[1, 166]. Any pruning is best done in the spring[188]. The seed only ripens outdoors in Britain in hot summers[11]. There are some named forms selected for their ornamental value[202]. Hybridizes freely with other members of this genus[200]. Special Features: Attracts birds, North American native, Invasive, All or parts of this plant are poisonous, Attracts butterflies, Attractive flowers or blooms.

5.2.658 Rhus potaninii

4 tin 8 cyuc 0 kcak 0 tcan 2 dwat 12 m hkc
htut cyutli tcup hwicli hrasjlnutyik hpa7tli flatprikliws hpa7tmwatli nyanhjen hjonli

drutta Rhus potaninii is a deciduous Tree growing to 12 m (39ft) by 8 m (26ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in June, and the seeds ripen from August to October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

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

tcanta Dye Ink Mordant OilThe leaves are rich in tannin. They can be collected as they fall in the autumn and used as a brown dye or as a mordant[169]. An oil is extracted from the

seeds[4]. It attains a tallow-like consistency on standing and is used to make candles. These burn brilliantly, though they emit a pungent smoke[4]. An indelible black ink is obtained from galls on the leaves[46, 61]. The report does not say if the galls are used before or after the insect leaves them.

dwatta Antiseptic Astringent HaemostaticAn exrescence produced on the leaf by an insect *Melaphis chinensis* or *M. paitan* is antiseptic, astringent and haemostatic[176]. It is used in the treatment of persistent cough with blood, chronic diarrhoea, spontaneous sweating, night sweats, bloody stool, urorrhoea and bloody sputum. It is used applied externally to burns, bleeding due to traumatic injuries, haemorrhoids and ulcers in the mouth[176].

nrakta E. Asia - C. and W. China. ksacta Thickets and in woods on slopes at elevations of 900 - 2500 metres[109, 266].

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

nwatta Succeeds in a well-drained fertile soil in full sun[11, 200]. The young growth in spring can be damaged by late frosts. A very ornamental plant[1], but it rarely flowers in Britain[11]. This species is very closely related to *R. punjabensis*[109]. Plants have brittle branches and these can be broken off in strong winds[200]. Plants are also susceptible to coral spot fungus[11]. Plants in this genus are notably resistant to honey fungus[200]. Many of the species in this genus are highly toxic and can also cause severe irritation to the skin of some people, whilst other species such as this one are not poisonous. It is relatively simple to distinguish which is which, the poisonous species have axillary panicles and smooth fruits whilst non-poisonous species have compound terminal panicles and fruits covered with acid crimson hairs[1, 4]. The toxic species are sometimes separated into their own genus, *Toxicodendron*, by some botanists[200]. Dioecious. Male and female plants must be grown if seed is required.

5.2.659 Chamaecyparis thyoides

White Cypress, Atlantic white cedar, Coast White Cedar, Southern White Cedar, White Cypress

4 tin 9 cyuc 0 kcak 0 tcan 1 dwat 10 m hkc
hmimhtut cyutli kyuctuphja7n hwicli hrasjlnutyikfrip hpa7tli frusflatprikliwslip hpa7tmwatli hjonli

drutta Chamaecyparis thyoides is an evergreen Tree growing to 10 m (32ft) by 3 m (9ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, in flower from March to April, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry moist or wet soil. The plant can tolerate strong winds but not maritime exposure. It cannot tolerate atmospheric pollution.

tcanta Hedge Hedge WoodPlants can be grown as a tall hedge[200] They are very tolerant of clipping so long as this does not extend into the brown barked wood since trees cannot regenerate from this[200]. Any trimming should be done in the summer[200]. Wood - soft, not strong, close grained, very durable, easily worked, light, slightly fragrant. It weighs 21lb per cubic foot. It is commonly used for woodenware, cooperage, fence posts, interior finish of houses etc[43, 46,

61, 82, 171, 235]. Wood found buried in swamps for hundreds of years is perfectly sound and not water-logged[11].

dwatta A decoction of the leaves has been used as a herbal steam for treating headaches and backaches[257]. A poultice made from the crushed leaves and bark has been applied to the head to treat headaches[257].

nrakta Eastern N. America - Maine, south to Florida and west to Mississippi. ksacta Cold, swampy often inundated ground, frequently forming dense pure forests[11, 43, 81, 82]. The best specimens are found in acid peat beds[229].

propta Seed - sow March/April in a seedbed outdoors[78]. The seed is best sown in pots in a frame[K]. Seed can take 18 months to germinate. One month warm then one month cold stratification has produced good results[113]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter, planting them out in late spring after the last expected frosts. Cuttings in late summer or autumn in sandy soil in a cold frame[1, 11, 200]. Difficult, it may be best done in late winter to early spring[113].

nwatta Landscape Uses:Pest tolerant, Screen, Specimen. Succeeds in most soils and situations, but prefers abundant moisture and a deep loamy soil and a sheltered position[1, 11]. Grows well in heavy clay soils. Survives on dry alkaline soils[200]. Growth of trees is hardly affected by a lack of phosphate in the soil. Plants are moderately shade tolerant, especially when young[81, 200]. Plants are tolerant of atmospheric pollution according to one report[200], whilst another says that they do not do well in a polluted atmosphere[1]. This species is especially well adapted for planting in cold wet places[1]. Plants are hardy to about -35°C[200]. A long-lived tree in the wild with specimens more than 1,000 years old[229]. It is slow growing in cultivation[200], trees rarely grow more than 20cm in a year[185]. The branches become brittle with age[1]. A very polymorphic species, there are many named varieties[200]. The crushed foliage has a rather gingery hot aroma[185]. Favoured by many birds for roosting, high cover and especially for nesting, large specimens of this tree help to attract songbirds to the garden[200]. Trees are notably susceptible to honey fungus[200]. Special Features:Attracts birds, North American native, Wetlands plant, Inconspicuous flowers or blooms.

5.2.660 Phellodendron chinense

Chinese Cork Tree

4 tlin 8 cyuc 0 kcaak 0 tcan 3 dwat 10 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikhwisslip hpa7tmwatli nyanhjen hjonli

drutta Phellodendron chinense is a deciduous Tree growing to 10 m (32ft) by 10 m (32ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in June, and the seeds ripen from September to October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). . The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers moist soil.

dwatta Antibacterial Bitter Cholagogue Diuretic Dysentery Expectorant Hypoglycaemic Ophthalmic Skin Stomachic Urinary VasodilatorThis species is used in Chinese herbalism in the same way as *P. amurense*[238, 254]. These uses are as follows:- Amur cork tree, called Huang Bai in China, is commonly used in Chinese herbalism, where it is considered to be one of the 50 fundamental herbs, but one that should be used with care[218, 254]. A strongly bitter remedy, the bark acts strongly on the kidneys and is regarded as a detoxicant for hot damp conditions[238]. Recent research has shown that the plant is useful in the treatment of meningitis and conjunctivitis[254]. Huang Bai should only be used under professional supervision and should not be taken during pregnancy[254]. The bark is alterative, antibacterial, anti-rheumatic, aphrodisiac, bitter stomachic, cholagogue, diuretic, expectorant, febrifuge, hypoglycaemic, ophthalmic, skin, vasodilator and tonic[4, 61, 174, 176, 178, 281, 238]. It is taken internally in the treatment of acute diarrhoea, dysentery, jaundice, vaginal infections including *Trichomonas*, acute urinary tract infections, enteritis, boils, ab-

cesses, night sweats and skin diseases[238, 254]. It is commonly used in conjunction with *Scutellaria baicalensis* and *Coptis chinensis* in a preparation called 'injection of three yellow herbs'[238]. It is given intramuscularly for upper respiratory tract infections[238]. The bark of 10 year old trees is harvested in the winter or spring and dried for later use[238, 254]. The fruit is expectorant[218].

nrakta E. Asia - Central China. ksacta Not known propta Seed - best sown in the autumn in a cold frame[200]. Stored seed requires 2 months cold stratification, sow in late winter in a cold frame[78, 113]. Germination is usually good. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the cold frame for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame. Pot up in autumn and over winter in a cold frame. Fair to good percentage[78]. Root cuttings - obtain in December and store in leafmold in a warm place for 3 weeks. Cut into 4cm lengths and plant horizontally in pots. Grow on in a warm greenhouse. Good percentage[78].

nwatta Prefers a moisture retentive well-drained deep rich loam in full sun[11, 200]. Prefers a neutral to alkaline soil[238]. Succeeds on shallow chalky soils[245]. Grows best in areas with long hot summers[200]. Plants are gross feeders and require a rich soil if they are to perform well[11]. Dormant plants are fully hardy in Britain, tolerating temperatures down to at least -20°C[188, 200], but the young growth is liable to damage from late spring frosts[11, 188, 200]. The leaves are aromatic[188]. Dioecious. Male and female plants must be grown if seed is required.

5.2.661 Celastrus angulatus

4 tlin 8 cyuc 0 kcaak 0 tcan 1 dwat 7.3 m hkuc pcmhmmhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikhwisslip hpa7tmwatli nyanhjen hjonli

drutta *Celastrus angulatus* is a deciduous Climber growing to 7.3 m (24ft) by 10 m (32ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August, and the seeds ripen from November to February. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

tcanta InsecticideThe plant has insecticidal properties[218].

dwatta CancerMany plants in this genus contain compounds of interest for their antitumour activity[218].

nrakta E. Asia - N., W. and C. China. ksacta Mountainous thickets and slopes at elevations of 1000 - 2500 metres[266].

propta Seed - gather when ripe, store in dry sand and sow February in a warm greenhouse[78]. Three months cold stratification leads to a higher germination rate[113]. Remove the flesh of the fruit since this inhibits germination[113]. Germination rates are usually good[78]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame[188]. Layering in August of the current seasons growth. Takes 12 months[78]. Root cuttings, 6mm thick 25mm long in December. Plant horizontally in pots in a frame[78].

nwatta Prefers a deep loamy soil[1] but succeeds in most soils so long as they are not too shallow[202]. Succeeds in full or partial shade[188]. Plants flower more freely if their top-growth is in the sun[182]. Requires a humus-rich soil if it is to be at its best[219]. A rampant climber, it requires ample space and is best grown into an old tree[1, 200]. It climbs by means of twining and also by the young stems having prickles[182]. Plants do not normally require pruning[219]. Plants in this genus are notably resistant to honey fungus[200]. Plants are dioecious, male and female plants must be grown if seed is required[200].

5.2.728 Zizia aptera

Meadow zizia, Golden alexanders

4 tlin 8 cyuc 0 kcaak 2 tcan 1 dwat 0.6 m hkuc hmimhtut cyutli hgatkyuctup hwicli hrasjlutnyik hpa7tli flatprikhwisslip hpa7tmwatli hjonli

drutta *Zizia aptera* is an evergreen Perennial growing to 0.6 m (2ft) by 0.6 m (2ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. The flowers are pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

tcanta Nectary: provides nectar or pollen for beneficial insects [1-2]. The flowers attract butterflies and seed heads attract birds. Various kinds of insects visit the flowers primarily for nectar, especially small bees (Halictid, Andrenid, Nomadine) and flies (Chloropid, Tachinid, Muscid, Syrphid, etc.), as well as occasional beetles and plant bugs. The bees collect pollen as well, while some flies and beetles may feed on pollen. The caterpillars of *Papilio polyxenes asterias* (Black Swallowtail butterfly) feed on the foliage of this and other members of the Carrot family [1-6]. Suitable for the wild garden and other informal plantings as well as collections of native wild flowers[200]. Cut Flower. Water Purifier: Used in raingarden plantings [318-1].

dwatta The presence of secondary compounds such as apterin may contribute to the potential medicinal value of *Zizia* species. *Zizia aurea* roots have been used by Native Americans as a tea to cure fevers, and the plant has been referred to as a vulnerary (wound-healing) agent [318-1].

nrakta Native Range: North America. ksacta Moist to dry black soil prairies, hill prairies, rocky upland woodlands, limestone glades, bluffs, abandoned fields, and roadsides. Usually, this species occurs in drier locations than *Zizia aurea* (Golden Alexanders) [1-6].

propta Seed - we have no information for this species but it is probably best sown in spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts.

nwatta An upright short-lived tap-rooted perennial wildflower in the Carrot (Apiaceae) family. Prefers sun or part sun with moist or dry soil. Plants tolerate clay loam, rocky or gravelly soil, alkaline pH and controlled burns. Drought Tolerant. Bloom Time: May to July. Bloom Description: Showy, Yellow. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2].

5.2.729 Delphinium nuttallianum

Larkspur, Twolobe larkspur

4 tlin 8 cyuc 0 kcaak 2 tcan 0 dwat 0.3 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikhwisslip hpa7tmwatli xre7t hjonli

drutta *Delphinium nuttallianum* is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from May to July. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista All parts of the plant are toxic[172]. The plant is most toxic when it is young[200].

tcanta Dye Ink ParasiticideA blue dye is obtained from the flowers[207, 257]. An ink can be made from the dye[207]. A parasiticide is obtained from the leaves[172]. It is quite toxic and so is for external use only.

nrakta Western N. America - British Columbia to California. ksacta Sagebrush desert to (more commonly)mountain valleys and slopes[60]. Most frequent in the ponderosa pine belt and is usually found in well-drained gravelly soils[60].

propta Seed - sow March/April in a cold frame or May outdoors[111]. Keep moist and in a shady position until germination takes place[175]. The seed has a limited viability so it should be stored in a sealed container at about 3°C[200]. Temperatures above 15°C inhibit germination[175]. The seed usually germinates in 2 - 9 weeks at 15°C[175]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in the summer. Cuttings of basal shoots in April/May, taken before they become hollow at the base, and planted in a cold frame[111]. Division in spring[111] or early autumn[200].

nwatta Prefers a rich well-drained soil[111, 200]. Dislikes water-logged soils[200]. Requires an open sunny position[188]. A very variable species, there are several subspecies[61]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54]. Slugs and snails are very attracted to this plant[200].

5.2.730 Chondrilla ambigua

Chondrilla, Sha di fen bao ju

4 tlin 9 cyuc 0 kcaak 3 tcan 0 dwat 0.5 m hkuc htut cyutli kyuctup hwicli hysihrasjlutnyik hpa7tli flatprikhwisslip hpa7tmwatli hjonli

drutta *Chondrilla ambigua* is an evergreen Perennial growing to 0.5 m (1ft 8in) by 0.5 m (1ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

tcanta Possibly a hydrocarbon latex crop. The species was experimentally cultivated in the USSR during the years 1929-1937 as a source of rubber. Carbon Farming Solutions - Industrial Crop: hydrocarbon (Crops grown for non-food uses. Industrial crops provide resources in three main categories: materials, chemicals, and energy. Traditional materials include lumber and thatch, paper and cardboard, and textiles) [1-1].

nrakta Northern Middle Asia. ksacta Sand dunes, gravel and loess areas; 300-800 m. Xinjiang - Kazakhstan, Russia (Southern European), Turkmenistan, Uzbekistan.

propta Seed

nwatta Experimental Crop Industrial Crop: Hydrocarbon Management: HayClimate: cold to warm temperate. Humidity: semi-arid to humid. A woody, broomlike perennial herb usually growing to 0.5m but can reach 1m high. It has a taproot which can be very deep and highly branched. Usually found in Sand dunes, gravel and loess (a type of silt which forms fertile topsoil - The soil has few clay particles to hold it together) areas; Grows at 300-800m in the wild. Needs a well drained dry to moist soil. This genus is closely related to the dandelions of genus *Taraxacum*. Plants of both genera undergo apomixis, producing fertile seeds via asexual reproduction. Carbon Farming Solutions - Cultivation: experimental. Management: hay (Describes the non-destructive management systems that are used in cultivation) [1-1].

5.2.731 Primula involucrata

4 tlin 8 cyuc 0 kcaak 0 tcan 2 dwat 0.3 m hkuc hmim cyutli tcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatprikhwisslip hpa7tmwatli xre7t hjonli

drutta *Primula involucrata* is a PERENNIAL growing to 0.3 m (1ft) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist or wet soil.

dwatta DysenteryThe entire plant is used in Tibetan medicine, it is said to have a sweet and bitter taste and a cooling potency[200]. Antidysenteric, anti-inflammatory and febrifuge, it is used in the treatment of contagious diseases and dysentery[241].

pollinated by Bees. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

tcanta DyeA blue dye obtained from the dried plant is an indigo substitute[74]. It is water soluble[74]. A yellow is obtained when the plant is mixed with alum[148]. Teasels are also occasionally grown as ornamental plants, and the dried heads are used in floristry. The seeds are an important winter food resource for some birds, notably the European goldfinch. Teasels are often grown in gardens and encouraged on some nature reserves to attract them. A rich source of pollen and nectar for bees and other insects. Formerly widely used in textile processing, providing a natural comb for cleaning, aligning and raising the nap on fabrics, particularly wool.

dwatta Cancer Diaphoretic Diuretic Homeopathy Skin Stomachic WartsTeasel is little used in modern herbalism, and its therapeutic effects are disputed[254]. Traditionally it has been used to treat conditions such as warts, fistulae (abnormal passages opening through the skin) and cancerous sores[254]. The root is diaphoretic, diuretic and stomachic[7]. An infusion is said to strengthen the stomach, create an appetite, remove obstructions of the liver and treat jaundice[4, 254]. The root is harvested in early autumn and dried for later use[7]. An infusion of the leaves has been used as a wash to treat acne[257]. The plant has a folk history of use in the treatment of cancer; an ointment made from the roots is used to treat warts, wens and whitlows[4, 218]. A homeopathic remedy is made from the flowering plant[7]. It is used in the treatment of skin diseases[7].

nrakta Europe, including Britain, from Norway south and east to N. Africa and W. Asia. ksacta Copses, stream banks, roadsides, rough pasture etc, especially on clay soils[17].

propta Seed - best sown in early spring in situ[115]. The seed can also be sown from February to May or from August to October. All but the earlier sowings can be made outdoors.

nwatta Succeeds in most soils[1] but prefers clay[17]. Prefers a deep rich soil[169]. Requires a sunny position[169]. A good butterfly plant[24]. This is the true wild species of teasel, its bracts are too flexible to be used for combing cloth[17]. The flowering heads are much prized by flower arrangers because they keep their colour almost indefinitely when dried[7].

5.2.726 *Dirca palustris*

Leather Wood, Eastern leatherwood
4 tlin 8 cyuc 0 kcaak 0 tcan 2 dwat 1.8 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Dirca palustris* is a deciduous Shrub growing to 1.8 m (6ft). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in March. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Contact with the plant can cause severe dermatitis with redness, blistering and sores in some people[222].

tcanta Basketry Fibre Hair Paper StringThe tough flexible shoots are used in basket making and as a tying material[1, 11, 43, 46, 95]. A rope can be made from the bark fibres[1, 11, 46, 61]. The bark fibres are also used in making paper[189]. The stems are harvested in summer, the leaves are removed and the stems steamed until the fibres can be stripped. The outer and inner barks are separated by scraping or peeling. The fibres are cooked for 2 hours or less with soda ash and then beaten with mallets or put through a blender. The paper is greenish cream in colour[189]. A compound infusion of the roots has been used as a wash to strengthen the hair and make it grow[257].

dwatta Emetic Laxative Pectoral Poultice VDLeatherwood was employed medicinally by a number of native North American Indian tribes who used it to treat a wide variety of ailments[257]. It is little used in modern herbalism and any use should be carried out with caution since even minute

doses can cause salivation and burning of the tongue[222]. A tea made from the bark is laxative[222]. Another report says that it is purgative and emetic, and can produce violent vomiting[235, 257]. An infusion of the roots has been used in the treatment of pulmonary problems[257]. A decoction of the branches has been applied as a poultice to swellings on the limbs[257]. The plant is a folk remedy for toothaches, facial neuralgia and paralysis of the tongue, venereal disease, and has also been used to try and induce pregnancy[222, 257].

nrakta Eastern N. America - New Brunswick to Florida, west to Louisiana and Minnesota. ksacta Rich deciduous or mixed woods[43] in moist situations, often on calcareous soils[200].

propta Seed - best sown in a cold frame as soon as it is ripe[113]. Remove the fruit flesh since this can inhibit germination[113]. Dried seed will require 2 - 3 months cold stratification[113]. The seed usually germinates in 1 - 6 months at 15°C[175]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Layering.

nwatta Thrives in a moist peaty soil[1, 11] and a sheltered position[175]. Prefers a reasonably moist humus-rich limy soil according to another report[182]. The flowers are produced in early spring and they are often damaged by frost[1, 200]. They have a soft sweet perfume[245]. The species *D. occidentalis* A.Gray, is very closely related to this plant[200], so it might have the same uses[K].

5.2.727 *Centaurea scabiosa*

Greater Knapweed
4 tlin 8 cyuc 0 kcaak 0 tcan 2 dwat 0.9 m hkuc
htut cyutli hgatkuyctcup hwicli hyishrasjlutnyik hpa7tli flatprikliwisliip hpa7tmwatli fyfjxre7t hjonli

drutta *Centaurea scabiosa* is a PERENNIAL growing to 0.9 m (3ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

dwatta Diaphoretic Diuretic Tonic VulneraryThe roots and seeds are diaphoretic, diuretic, tonic and vulnerary[4]. The plant once had a very high reputation as an ingredient of the Medieval 'salve', an ointment applied to heal wounds and treat skin infections[4, 254].

nrakta Much of Europe, including Britain, north to 68° N., east to the Caucasus and W. Asia. ksacta Pastures, field edges and roadsides, usually on chalk[4, 17].

propta Seed - sow early spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in the summer. Division in autumn. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the summer or following spring. This should be done at least once every three years in order to maintain the vigour of the plant. Basal cuttings in spring. Harvest the shoots when they are about 10 - 15cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Succeeds in ordinary garden soil[1, 200]. Prefers a well-drained fertile soil and a sunny position[200]. Tolerates dry, low fertility and alkaline soils[200]. Does well in the summer meadow[24]. An important nectar plant for bees and butterflies[24]. Members of this genus are rarely if ever troubled by browsing deer[233].

5.2.662 *Fraxinus bungeana*

Xiao Ye Qin
4 tlin 8 cyuc 0 kcaak 0 tcan 2 dwat 5 m hkuc
htut cyutli kyuctup hwicli hrasjlutnyik hpa7tli flatprikliwisliip hpa7tmwatli xre7t hjonli

drutta *Fraxinus bungeana* is a deciduous Shrub growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

tcanta Wax Weather protectionA commercial insect wax is produced on the branches[178]. We are not sure how the wax is produced, one report says that it is as a result of eggs being laid by insects. Another report says that the wax is produced by the plant due to the stimulation of the feeding insects. Yet another report says that the wax is produced from secretions of the insects[178]. The wax is used for making candles and as a polish for earthenware pots, book edges etc[178]. The plant (extract?) is said to be used as a barrier to protect the skin from ultra-violet light[176].

dwatta Analgesic Antiinflammatory Antitussive Diuretic Dysentery ExpectorantThe bark is analgesic, anti-inflammatory, antitussive, diuretic and expectorant[176, 238]. It controls bacterial infections and coughs[238]. It is used in the treatment of diarrhoea, dysentery, cataracts, cough and asthma[176]. The bark contains aesculin, this has anti-inflammatory, anticoagulant and analgesic actions[176]. The bark also contains fraxetin. This has an inhibitory effect on the central nervous system, is a stronger and safer anodyne than aspirin and has some antibacterial activity[176].

nrakta E. Asia - N. China. ksacta Dry sandy soils, rock crevices at elevations of 0 - 1500 metres in Anhui, Hebei, Henan, Liaoning, Shandong and Shanxi[266].

propta The seed is best harvested green - as soon as it is fully developed but before it has fully dried on the tree - and can then be sown immediately in a cold frame[80]. It usually germinates in the spring[80]. Stored seed requires a period of cold stratification and is best sown as soon as possible in a cold frame[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant them out into their permanent positions or a nursery bed in late spring or early summer of the following year. If you have sufficient seed then it is possible to sow it directly into an outdoor seedbed, preferably in the autumn. Grow the seedlings on in the seedbed for 2 years before transplanting either to their permanent positions or to nursery beds.

nwatta Prefers a deep loamy soil, even if it is on the heavy side[1, 200]. Most members of this genus are gross feeders and require a rich soil[200]. Plants succeed when growing in exposed positions[200] and also in alkaline soils[11]. They tolerate atmospheric pollution[200]. A very ornamental plant[1]. This species might be dioecious, in which case male and female plants must be grown if seed is required.

5.2.663 *Lonicera sempervirens*

Trumpet Honeysuckle, Coral Honeysuckle
4 tlin 9 cyuc 0 kcaak 0 tcan 1 dwat 5 m hkuc
htut cyutli kyuctup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Lonicera sempervirens* is an evergreen Shrub growing to 5 m (16ft 5in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

dwatta Antiasthmatic Cathartic Emetic StingsThe fruit is emetic and cathartic[207]. The expressed juice of the plant is beneficial in the treatment of bee stings[207]. The leaves have been dried and smoked as a treatment for asthma[213].

nrakta Eastern and Southern N. America - Connecticut to Florida and Texas. ksacta Borders of woods and thickets[213].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed requires 2 months cold stratification[113] and should be sown as soon as possible in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm with or without a heel, July/August in a frame. Good percentage[78]. Cuttings of mature wood of the current season's growth, 15 - 20cm with or without a heel, November in a cold frame. Good percentage[78]. Layering in autumn[200].

nwatta Landscape Uses:Arbor; Specimen. Succeeds in most soils but prefers a good moist soil in a sunny position[182]. Does not fruit so well when grown in the shade[200]. Plants are very hardy, tolerating temperatures down to -15°C or lower[260], though they can be deciduous in cold winters[219]. Special Features: Attracts birds, North American native, Wetlands plant, Attracts butterflies, Extended bloom season in Zones 9A and above, Fragrant flowers, Attractive flowers or blooms. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. Woody. Growth habit is a single or multiple shooting vine from a crown [1-2].

5.2.664 *Clematis ligusticifolia*

White Clematis, Western white clematis, California clematis,
4 tlin 8 cyuc 0 kcaak 0 tcan 2 dwat 5 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Clematis ligusticifolia* is a deciduous Climber growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from August to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no reports of toxicity have been seen for this species, some if not all members of this genus are mildly poisonous. The toxic principle is dissipated by heat or by drying[65].

tcanta Fibre Hair Insulation Miscellany TinderThe seed floss makes an excellent tinder for starting fires, a spark from a flint will quickly ignite it[212]. The seed floss can be used as an insulation in shoes etc[212]. It has also been used in baby's nappies[257]. The stems have been used to make a string[257]. A shampoo made from the roots can be used as a hair shampoo[257].

dwatta Analgesic Contraceptive Eczema Febrifuge Miscellany Odontalgic Poultice Skin Stomachic Tonic VDWhite clematis was employed medicinally by a number of native North American Indian tribes who used it to treat a variety of complaints, but especially as an external application on sores etc[257]. It is rarely used in modern herbalism but probably merits investigation[K]. A decoction of the plant is used to treat colds and sore throats[212, 257]. It has also been used as a general tonic when feeling out of sorts[257]. An infusion of the white bark has been used as a febrifuge[213, 257]. An infusion of the roots has been used to treat headaches and stomach aches[257]. A poultice of the foliage has been used to treat chest pains and rheumatic joints[257]. An infusion of the plant has been used as a wash for skin eruptions, sores, wounds, backaches, swollen limbs, tired feet,

syphilitic sores, eczema etc[257]. The stalks and roots have been used to make a woman's contraceptive[257]. A poultice made from the cut stems has been applied to the teeth for treating toothache[257]. A poultice of the mashed, moistened seeds has been applied to severe burns[257].

nrakta Western N. America - Alberta and British Columbia south to California and New Mexico. ksacta Grows over trees and shrubs along rivers, creek banks and canyon bottoms[212].

propta Seed - best sown as soon as it is ripe in a cold frame[164, 200]. Sow stored seed as soon as it is obtained in a cold frame. Pre-soak the seed for 12 hours in warm water and remove as much of the tail and outer coat as possible[164]. A period of cold stratification is beneficial[164]. The seed germinates in 1 - 9 months or more at 20°C[164]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant out in late spring or early summer, after the last expected frosts. Internodal cuttings of soft to semi-ripe wood, late spring in sandy soil in a frame[200]. Layering of old stems in late winter or early spring[200]. Layering of current seasons growth in early summer[200].

nwatta Prefers a deep moist soil with its roots in the shade[11, 200]. Dislikes poorly-drained heavy clay soils, but grows well in clay if grit is added for drainage[11, 200]. Dislikes light sandy soils[11]. Does well on chalk[1]. Succeeds in acid as well as alkaline soils[200]. When planting out, in order to avoid the disease 'clematis wilt', it is best to plant the rootball about 8cm deeper in the soil. This will also serve to build up a good root crown of growth buds[200]. A twining plant[182]. The leafstalks wrap themselves around twigs and branches for support. When a side of the stalk touches an object, the growth on that side slows down whilst the other side grows at its normal rate - this causes the leaf stalk to entwine the object it is touching[212]. Plants seem to be immune to the predations of rabbits[233]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

5.2.665 Miscanthus x giganteus

Giant Miscanthus

4 tlin 9 cyuc 0 kcak 4 tcan 0 dwat 4 m hkuc htut cyutli hgatyuctcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli hjonli

drutta Miscanthus x giganteus is a PERENNIAL growing to 4 m (13ft) by 0.6 m (2ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

tcanta FodderCarbon Farming Solutions - Industrial Crop: biomass (Crops grown for non-food uses. Industrial crops provide resources in three main categories: materials, chemicals, and energy. Traditional materials include lumber and thatch, paper and cardboard, and textiles) [1-1]. Very few perennial industrial crops have been properly domesticated. Those that have show significantly increased yields. Miscanthus x giganteus is partly domesticated [1-1]. An outstanding biomass producer in temperate climates needing very little nitrogen fertilizer. Most giant Miscanthus is used as biofuel but could also serve as a feedstock for any number of biobased materials [1-1]. Fodder: bank. A possible good candidate for contour hedgerows in agroforestry. An excellent wind break. A popular ornamental - Outstanding fall color with persistent winter interest.

nrakta Origin: Hybrid of Asian species. ksacta Hybrid propta Vegetative propagation methods are necessary since giant Miscanthus does not produce viable seed. Rhizomes

nwatta Fodder: Bank Industrial Crop: Biomass Management Hay New Perennial CropClimate: cold temperate to subtropical. Humidity: humid. A sterile (non-invasive) hybrid of *M. sinensis* and *M. sacchariflorus*. A very fast growing to 4m in 15 months - but manageable plant. Dry to average water needs - sensitive to too much water on roots. Drought Tolerant. well-drained soil. Full sun. Carbon Farming Solutions - Cultivation: new crop. Management: hay (Describes the non-destructive management systems that are used in cultivation) [1-1].

5.2.666 Juniperus sabina

Savine, Tam Juniper

4 tlin 7 cyuc 0 kcak 4 tcan 2 dwat 4 m hkuc htut cyutli hgatyuctcup hwicli hrasjlutnyik hpa7tli flatprikliwisslip hpa7tmwatli nyanhjen hjonli

drutta Juniperus sabina is an evergreen Shrub growing to 4 m (13ft) by 4 m (13ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in leaf all year, in flower in April, and the seeds ripen in October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

pcista The whole plant is poisonous and can produce abortions[4].

tcanta Essential Hedge Hedge Insecticide Parasiticide RepellentLeaves are used as an insect repellent, a decoction of them is used against lice[46, 61]. An essential oil from the leaves and shoots has strong diuretic properties and is also used in perfumery[1, 61]. Yields of around 4% are obtained, this oil is also used as an insecticide[7]. A good dense ground cover plant, though it is slow to cover the ground[197]. The species type eventually forms a high ground cover, but there are many named forms that are lower-growing[208]. The sub-species *J. sabina tamariscifolia* has been particularly recommended[188]. Plants should be spaced about 1.2 metres apart each way[208]. The taller forms of this species make a good hedge[245].

dwatta Abortifacient Diuretic Emetic Emmenagogue Irritant Parasiticide WartsThe young shoots are abortifacient, diuretic, emetic, powerfully emmenagogue and irritant[4, 7]. The plant is rarely used internally but is useful as an ointment and dressing to blisters etc in order to promote discharge[4]. The powdered leaves are also used in the treatment of warts[1, 4, 7, 21]. The shoots are harvested in spring and dried for later use[4]. Use with great caution and never during pregnancy[4, 21]. see notes above on toxicity.

nrakta C. and S. Europe to N. America. ksacta Dry stony places in mountains[50], usually on limestone[11], at elevations of 1000 - 2300 metres.

propta The seed requires a period of cold stratification. The seed has a hard seedcoat and can be very slow to germinate, requiring a cold period followed by a warm period and then another cold spell, each of 2 - 3 months duration[78, 81]. Soaking the seed for 3 - 6 seconds in boiling water may speed up the germination process[11]. The seed is best sown as soon as it is ripe in a cold frame. Some might germinate in the following spring, though most will take another year. Another possibility is to harvest the seed 'green' (when the embryo has fully formed but before the seedcoat has hardened). The seedlings can be potted up into individual pots when they are large enough to handle. Grow on in pots until large enough, then plant out in early summer. When stored dry, the seed can remain viable for several years[1]. Cuttings of mature wood, 5 - 10cm with a heel, September/October in a cold frame. Plant out in the following autumn[1, 78]. Layering in September/October. Takes 12 months[78].

nwatta Landscape Uses:Alpine garden, Erosion control, Ground cover, Massing, Rock garden. Succeeds in most soils if they are well drained, preferring a neutral or slightly alkaline soil[1, 11]. Prefers a limestone soil[1]. Succeeds in poor soils and in light shade[197]. Established plants are drought tolerant, succeeding in hot dry positions[200]. Tolerates maritime exposure[200]. A very ornamental plant[1], there are many named varieties[188]. All parts of the plant have a powerful pungent smell[245]. Plants can be dioecious or monoecious. Male and female plants must be grown if fruit and seed are required. The plant is sometimes attacked by a rust, this is a fungus with an aecidial stage on the leaves of pear trees[1]. Plants are resistant to honey fungus[88]. Special Features: Not North American native, Inconspicuous flowers or blooms. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root

before they become hollow at the base, and planted in a cold frame[111]. Division in spring[111] or early autumn[200].

nwatta Landscape Uses:Border, Foundation, Massing, Seashore, Specimen. Prefers a rich well-drained soil that stays moist in the summer[111, 187]. Dislikes water-logged soils[200], it is liable to die out in heavy soils over winter[111]. Requires an open sunny position[188]. This species is the main parent of the many tall hybrid forms of delphiniums that are commonly grown as garden ornamentals[200]. A variable species in the wild, varying in height from 40cm to 2 metres[200]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54]. Special Features: Attracts birds, all or parts of this plant are poisonous, Suitable for cut flowers, Suitable for dried flowers.

5.2.722 Senecio jacobaea

Ragwort, Stinking willie

4 tlin 8 cyuc 0 kcak 0 tcan 2 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hyishrasjlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta Senecio jacobaea is a PERENNIAL growing to 1 m (3ft 3in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to October, and the seeds ripen from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

pcista All parts of the plant are poisonous[4, 19]. The plant contains pyrrolizidine alkaloids, in isolation these substances are highly toxic to the liver and have a cumulative affect even when the whole plant is consumed[65, 254].

tcanta DyeA good green dye is obtained from the leaves, though it is not very permanent[4, 115]. A yellow dye is obtained from the flowers when alum is used as a mordant[4, 115, 168]. Brown and orange can also be obtained[168].

dwatta Antirheumatic Astringent Diaphoretic Diuretic Emmenagogue Expectorant HomeopathyThe plant is astringent, diaphoretic, diuretic, emmenagogue and expectorant[9, 21]. The plant is harvested as it comes into flower and is dried for later use[9]. Use with caution[21], when applied internally it can cause severe damage to the liver[9]. See also the notes above on toxicity. An emollient poultice is made from the leaves[4]. The juice of the plant is cooling and astringent, it is used as a wash in burns, sores, cancerous ulcers and eye inflammations[4]. It makes a good gargle for ulcerated mouths and throats and is also said to take away the pain of a bee sting[4]. Caution is advised here since the plant is poisonous and some people develop a rash from merely touching this plant[K]. A decoction of the root is said to be good for treating internal bruises and wounds[4]. A homeopathic remedy is made from the plant[9]. It is used in the treatment of dysmenorrhoea and other female complaints, internal haemorrhages and other internal disorders[9].

nrakta Europe, including Britain, south and east from Scandinavia to N. Africa, Cascaua and W. Asia. ksacta Waste ground and pastures on all but the poorest soils[4, 17]. It is often only an annual[17].

propta A noxious weed, it doesn't need any help in spreading itself about.

nwatta Succeeding on all but the poorest soils, this plant is a declared noxious weed in Britain spreading freely by seed. It should not be cultivated other than in controlled conditions for scientific research. Ragwort can be eradicated by pulling it up just before it comes into flower, or by cutting it down as the flowers begin to open (this latter may need to be repeated about six weeks later)[4]. Ragwort is a good food plant for the caterpillars of many butterfly and moth species, and is one of only two species that provide food for cinnabar moth caterpillars.

5.2.723 Peucedanum oreoselinum

4 tlin 8 cyuc 0 kcak 0 tcan 1 dwat 1 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta Peucedanum oreoselinum is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista Although no mention of toxicity has been seen for this species, skin contact with the sap of a number of members in this genus is said to cause photo-sensitivity and/or dermatitis in some people[65, 218]. They are also said to contain the alleged 'psychotroph' myristicine[218].

tcanta EssentialThe plant yields an essential oil[61]. No further details on use or what part of the plant the oil is obtained from.

dwatta DiureticDiuretic[61].

nrakta Europe. ksacta Not known

propta Seed - we have no information on this species but suggest sowing the seed in a cold frame as soon as it is ripe if this is possible otherwise in early spring. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer.

nwatta We have very little information on this species and do not know if it will be hardy in Britain, though since its native range is all of Europe except the islands and extreme north and south, it should succeed outdoors in this country. The following notes are based on the general needs of the genus. An easily grown plant, it succeeds in any moisture-retentive soil in a sunny position[200]. Suitable for group plantings in the wild garden[200].

5.2.724 Bromus ramosus

Hairy Brome

4 tlin 8 cyuc 0 kcak 0 tcan 1 dwat 1.5 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

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

dwatta BachThe plant is used in Bach flower remedies - the keywords for prescribing it are 'Uncertainty', 'Despondency' and 'Dissatisfaction'[209].

nrakta Most of Europe south from Scandinavia, including Britain, to N. Africa and temperate Asia. ksacta Hedges and woods[17].

propta Seed - sow spring or autumn in situ and only just cover. Germination should take place within 2 weeks. If seed is in short supply it can be surface sown in a cold frame in early spring. When large enough to handle, prick out the seedlings into individual pots and plant them out in early summer. Division in spring. Large clumps can be planted out direct into their permanent positions whilst it is best to pot up smaller clumps and grow them on in a cold frame until they are ready to be planted out.

nwatta Succeeds in a sunny position in most well-drained soils[138, 200].

5.2.725 Dipsacus fullonum

Teasel, Fuller's teasel

4 tlin 8 cyuc 0 kcak 2 tcan 2 dwat 1.8 m hkuc htut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta Dipsacus fullonum is a BIENNIAL/PERENNIAL growing to 1.8 m (6ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is

keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Succeeds in most good garden soils[1], preferring one that is well-drained and moisture retentive[200]. Prefers a sunny position[200], but it also succeeds in partial shade[233]. Prefers a rich soil[1], but tolerates poor ones[233]. Plants are hardy to about -25°c[187]. A polymorphic species, there are many named varieties selected for their ornamental value[1]. Hybridizes freely with other members of this genus[200]. Plants need to be divided every few years, preferably in the spring, in order to keep the plant vigorous[187]. Most species in this genus seem to be immune to the predations of rabbits[233]. Attracts butterflies and moths, it is also a good bee plant providing nectar in autumn[30]. Special Features: Attracts birds, Naturalizing, Attracts butterflies, Suitable for cut flowers.

5.2.719 Eupatorium cannabinum

Hemp Agrimony

4 tlin 8 cyuc 0 kcaak 0 tcan 3 dwat 1.5 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyfxre7t hjonli

drutta Eupatorium cannabinum is a PERENNIAL growing to 1.5 m (5ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles, Lepidoptera (Moths and Butterflies). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

tcanta Preservative RepellentThe leaves have been laid on bread in order to prevent it from becoming mouldy[4]. The leaf juice has been rubbed onto the coats of animals as an insect repellent[7].

dwatta Alterative Antitumor Cholagogue Depurative Diaphoretic Diuretic Emetic Expectorant Febrifuge Homeopathy Laxative Purgative TonicHemp agrimony has been employed chiefly as a detoxifying herb for fevers, colds, flu and other viral conditions. It also stimulates the removal of waste products via the kidneys[254]. Due to its content of alkaloids, the plant should only be used under professional supervision[254]. The leaves and flowering tops are alterative, cholagogue, depurative, diuretic, emetic, expectorant, febrifuge, purgative and tonic[4, 7, 9, 21, 46, 238]. The plant has a long history of use as a gentle laxative that does not provoke irritation[7], though excessive doses cause purging and vomiting[238]. A tea made from the dried leaves will give prompt relief if taken at the onset of influenza[4]. Recent research has shown that the plant might have anti-tumour activity, though the plant also contains pyrrolizidine alkaloids that can cause damage or cancer to the liver[238]. The plant is harvested in the summer and dried for later use[7]. The roots are diaphoretic, laxative and tonic[7]. They are harvested in the autumn and dried for later use[238]. Recently the plant has been found of use as an immune system stimulant, helping to maintain resistance to acute viral and other infections[254]. A homeopathic remedy is made from the leaves[4]. It is used in the treatment of influenza and feverish chills[4] and also for disorders of the liver, spleen and gall bladder[9].

nrakta Most of Europe, including Britain, to N. Africa, western and central Asia. ksacta By streams, in low damp sites and in woods, avoiding acid soils[7, 13].

propta Seed - sow spring in a cold frame and only just cover the seed. Prick out the seedlings into individual pots when they are large enough to handle and plant them out into their permanent positions in the summer. If you have sufficient seed it can be sown outdoors in situ. Division in spring or autumn[111]. Very easy, the clumps can be replanted direct into their permanent positions.

nwatta An easily grown plant[233], it succeeds in ordinary garden soil in sun or part shade[200]. Prefers a rich moist soil[187]. Grows well in marshy soils[21]. Plants are hardy to about -25°c[187]. A very ornamental plant[1], it has a pleasant aromatic smell when cut[4]. Often found as a weed in British gardens, it can be allowed to naturalize in short

grass in the wild garden[233]. Plants seem to be immune to the predations of rabbits[233]. An excellent bee and butterfly plant[24, 108].

5.2.720 Stratiotes aloides

Water Soldier

4 tlin 8 cyuc 0 kcaak 0 tcan 1 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Stratiotes aloides is a PERENNIAL growing to 1 m (3ft 3in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

dwatta The herb has had a high reputation for treating wounds, especially when these are made by an iron implement. It is applied externally[4]. The plant is also said to be of use in the treatment of St. Anthony's Fire and also of bruised kidneys[4].

nrakta Europe, including Britain, to northwestern Asia. ksacta Broads, ponds and ditches in calcareous districts[17]. It is very local and probably diminishing[17].

propta Seed - best sown in situ as soon as it is ripe. The seed is seldom if ever produced in Britain[17]. Division at almost any time of the year, though spring is best.

nwatta A water plant, it requires a neutral to alkaline water[200]. The herb is submerged at most times of the year, rising to the surface only when it is flowering[17]. The leaves accumulate calcium carbonate and by the autumn this makes them heavy enough to sink to the bottom of the pond. The new leaves in spring do not have this calcium carbonate and so rise to the surface[200]. A vigorous-growing plant, it will tend to swamp out other plants when grown in a small pond[200]. Plants are dioecious, male and female plants must be grown if seed is required[17]. Only the female plant occurs naturally in Britain, though plants with hermaphrodite flowers are also found occasionally[17]. Seed is never set in Britain, the plants increasing mainly by off-sets[17].

5.2.721 Delphinium elatum

Candle larkspur, English Larkspur

4 tlin 7 cyuc 0 kcaak 0 tcan 1 dwat 1 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Delphinium elatum is a PERENNIAL growing to 1 m (3ft 3in) by 0.3 m (1ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from June to July, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista All parts of the plant are toxic[65, 172]. The plant is most toxic when it is young[200].

tcanta The seed contains 1.7% alkaloids and is used as an insecticide[240].

dwatta Anthelmintic Aperient Diuretic EmeticThe whole plant, but especially the seeds, is anthelmintic, aperient, diuretic and emetic[240].

nrakta E. Asia - Western Himalayas from Kashmir to Kumaon. ksacta Temperate areas from 3000 - 3600 metres[240]. Grassy slopes at elevations of 1900 - 2100 metres in Tibet[266].

propta Seed - sow March/April in a cold frame or May outdoors[111]. Keep moist and in a shady position until germination takes place[175]. The seed has a limited viability so it should be stored in a sealed container at about 3°c[200]. Temperatures above 15°c inhibit germination[175]. The seed usually germinates in 2 - 9 weeks at 15°c[175]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in the summer. Cuttings of basal shoots in April/May, taken

pattern is flat with shallow roots spreading near the soil surface [2-1].

5.2.667 Juniperus squamata

Flaky Juniper

4 tlin 7 cyuc 0 kcaak 0 tcan 1 dwat 4 m hkuc htut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli nyanhjen hjonli

drutta Juniperus squamata is an evergreen Shrub growing to 4 m (13ft) by 5 m (16ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, and the seeds ripen in October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

tcanta Fuel Incense WoodThe cultivar 'Blue Carpet' can be used as a ground cover plant in a sunny position[188]. The wood is very fragrant, it is used as a fuel and an incense[51, 158, 272]. The leaves are used as incense[272].

dwatta SkinThe powdered plant is soaked for half an hour in water and then used for washing skin diseases[272]. nrakta E. Asia - China, Himalayas, Afghanistan. ksacta Inner valleys of the Himalayas, 3000 - 4500 metres from Afghanistan to S.W. China[51]. Forests, thickets, valleys and roadsides in mountain areas from 1600 - 4500 metres[266].

propta The seed requires a period of cold stratification. The seed has a hard seedcoat and can be very slow to germinate, requiring a cold period followed by a warm period and then another cold spell, each of 2 - 3 months duration[78, 81]. Soaking the seed for 3 - 6 seconds in boiling water may speed up the germination process[11]. The seed is best sown as soon as it is ripe in a cold frame. Some might germinate in the following spring, though most will take another year. Another possibility is to harvest the seed 'green' (when the embryo has fully formed but before the seedcoat has hardened). The seedlings can be potted up into individual pots when they are large enough to handle. Grow on in pots until large enough, then plant out in early summer. When stored dry, the seed can remain viable for several years[1]. Cuttings of mature wood, 5 - 10cm with a heel, September/October in a cold frame. Plant out in the following autumn[1, 78]. Layering in September/October. Takes 12 months[78].

nwatta Landscape Uses:Cascades, Erosion control, Ground cover, Massing, Rock garden. Succeeds in most soils if they are well drained, preferring a neutral or slightly alkaline soil[1, 11] and succeeding on chalk[200]. A drought tolerant plant once established, succeeding in hot dry positions[200]. This species is closely allied to *J. recurva*[11]. There are many named forms, selected for their ornamental value[188]. The type species is very slow growing in Britain[185] but the cultivar 'Meyer' is somewhat faster and more successful. Dioecious. Male and female plants must be grown if seed is required. Special Features:Attractive foliage, Fragrant foliage, Not North American native, There are no flowers or blooms.

5.2.668 Buddleia davidii

Butterfly Bush, Summer Lilac, Butterflybush

4 tlin 8 cyuc 0 kcaak 1 tcan 0 dwat 3 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli hjonli

drutta Buddleia davidii is a deciduous Shrub growing to 3 m (9ft) by 3 m (9ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to October, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and

can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure. It can tolerate atmospheric pollution.

tcanta DyeBlack or green dyes can be obtained from the flowers, leaves and stems combined[168]. An orange-gold to brown dye can be obtained from the flowers[168]. An extremely popular garden plant due to its low maintenance, long flowering season, colourful and fragrant flowers, and its attractiveness to butterflies. The flowering *B. davidii* has been closely linked with butterflies, moths and humming-birds[1d].

nrakta E. Asia - China. Naturalized in Britain[17]. ksacta Found in rocky riverside habitats 1300 - 2600 metres in China[200]. Waste places, often on brick walls in Britain[17].

propta Seed - cold stratify for 4 weeks at 4°c[138] and surface sow the seed in February/March in a greenhouse[78, 113]. Germination usually takes place within 3 - 4 weeks at 21°c[138]. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter, planting them out into their permanent positions in late spring or early summer, after the last expected frosts. Seedlings are inclined to damp off and so should be watered with care and kept well-ventilated[78]. Cuttings of half-ripe wood, July/August in a frame[11, 113]. Use short side-shoots[78]. Very high percentage[113]. Cuttings of mature wood of the current season's growth, 15 - 20cm long, October/November in a frame[200].

nwatta Landscape Uses:Border, Container, Pest tolerant, Massing, Standard, Specimen. Requires a sunny position[11, 182]. Prefers a rich loamy well-drained soil[11, 200]. Very tolerant of alkaline soils, atmospheric pollution and maritime exposure[200]. Grows best on dry soils of low fertility, where it can seed itself freely[182]. Plants are hardy to about -15°c[184], they resprout from the base if cut back by cold weather[200]. A very ornamental plant[1], it hybridizes freely with other members of this genus. Polymorphic, there are many named varieties, developed for their ornamental value[182]. The flowers emit a musk-like fragrance like heather honey[245]. Plants flower mainly on the current years growth so a hard pruning in spring will encourage better flowering[200]. An excellent plant for bees and butterflies[30]. Special Features:Attracts birds, Not North American native, Naturalizing, Attracts butterflies, Suitable for cut flowers, Attractive flowers or blooms.

5.2.669 Menispermum davuricum

4 tlin 8 cyuc 0 kcaak 0 tcan 2 dwat 3.6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Menispermum davuricum is a deciduous Climber growing to 3.6 m (11ft 10in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from June to July, and the seeds ripen from October to November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The whole plant is poisonous[18].

dwatta Antirheumatic Cancer SkinThe root is antirheumatic and is also used in the treatment of cancer[218]. The whole plant is used to alleviate skin allergies and is also used in the treatment of cancer[218].

nrakta E. Asia - Siberia to N. China. ksacta Sparse forests ad bushes at the road[266].

propta Seed - sow late winter in a greenhouse[78, 113]. Two months cold stratification speeds up germination[113] so it might be better to sow the seed as soon as it is ripe in a cold frame[K]. Germination is usually good[78]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of mature wood, autumn in a frame[200]. Division of suckers in early spring[78, 113]. The suckers can be planted out direct into their permanent positions, though

we prefer to pot them up and grow them on in light shade in a greenhouse or cold frame until they are established[K].

nwatta Succeeds in any moderately fertile soil that does not dry out excessively in summer, in sun or partial shade[200]. Prefers full sun[219]. This species is hardy to about -30°C, but, due to a lack of summer heat, the plants usually produce soft growth in mild maritime areas and this can be cut to the ground at temperatures around -5 to -10°C[200]. The plants do not require pruning, but can benefit from being cut back to ground level every 2 - 3 years in order to keep them tidy[219]. Closely related to *M. canadense*, differing mainly in its annual or rarely persistent aerial stems[200]. A twining plant, it spreads freely by means of underground suckers[11, 182]. Dioecious. Male and female plants must be grown if seed is required.

5.2.670 Ligustrum vulgare

Privet, European privet , Common Privet

4 tin 7 cyuc 0 kcaak 3 tcan 1 dwat 3 m hkuc hmimhtut cyutli hgatkyuctcup hwicli hrasjlutnykfrip hpa7tli flatprikliwssip hpa7tmwatli xre7t hjonli

drutta Ligustrum vulgare is an evergreen Shrub growing to 3 m (9ft) by 3 m (9ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in leaf all year, in flower from June to July, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure. It can tolerate atmospheric pollution.

pcista Poisonous[10], though the toxicity is of a very low order and normally the consumption of the fruit leads to vomiting or no symptoms at all[65].

tcanta Basketry Charcoal Dye Ink WoodA yellow dye is obtained from the leaves[6], from the bark, according to other reports[46, 61]. A bluish-green dye is obtained from the berries[6, 46, 61]; it is more permanent than most greens[115]. A black dye can also be obtained from the fruit[61] and an ink[46, 61]. Wood - hard, close-grained. It is valuable for turning if it reaches sufficient size[115] and can also make small tools[46, 61]. The wood is a source of charcoal[46, 61]. The young twigs are used in basketry and hurdle making[46, 61, 100]. Landscape Uses:Border, Hedge, Screen, Superior hedge. Naturalizing, Attractive flowers or blooms.

dwatta Astringent Bitter Detergent VulneraryThe leaves are astringent, bitter, detergent, vulnerary[7, 21]. Internal use of this plant should be avoided since it can produce allergic symptoms[7]. Externally it is a safe and effective treatment[7]. The bark has been used as a stomachic[7], though this is not really recommended.

nrakta Central and southern Europe, including Britain, to N. Africa. ksacta Open woodland, hedges and scrub, often by the sea and usually on calcareous soils[10, 17, 50].

propta Sow the seed in spring in a cold frame. Stored seed germinates better if it is stratified,[113]. Remove any fruit flesh from around the seed before it is sown since this can inhibit germination[113]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the cold frame for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. The seed can also be sown in outdoor seed beds in the autumn. You can leave the plants to grow on in the seedbed for up to 4 years before planting them out into their permanent positions in the winter. Cuttings of half-ripe wood, 5 - 10cm with a heel, July/August in a frame. Very easy[78]. Cuttings of mature wood, 20 - 30cm in a sheltered outdoor bed in November/December[78]. The cuttings can also be placed in situ if required. High percentage[78].

nwatta A very tolerant and easily growing plant, it succeeds in any soil that is not very impoverised[11]. Grows well in heavy clay soils. Prefers a calcareous soil and succeeds in thin dry soils[186]. Grows well in light woodland or the full shade of a wall but flowers and fruits best in a sunny

position[186]. Tolerant of atmospheric pollution, once established they also tolerate drought but are intolerant of water-logging[186]. A suckering shrub, forming dense thickets and making good bird cover[186]. An important food plant for many caterpillars, including the larvae of the privet hawk moth[186]. This species is notably susceptible to honey fungus[200]. Special Features:Not North American native, Invasive, Naturalizing, Attractive flowers or blooms.

5.2.671 Cornus rugosa

Round-Leaved Dogwood

4 tin 8 cyuc 0 kcaak 0 tcan 1 dwat 3 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnykfrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Cornus rugosa* is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 5. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

dwatta Cathartic Febrifuge Kidney TB TonicThe bark is cathartic, febrifuge and tonic[61, 257]. A decoction of the roots has been used in the treatment of kidney complaints and TB[257].

nrakta Eastern N. America - Quebec to Manitoba and south to Virginia and Illinois. ksacta Dry woods and rocky slopes[43].

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

nwatta An easily grown plant, it succeeds in any soil of good or moderate fertility[11], ranging from acid to shallow chalk[200]. Grows well in heavy clay soils. Succeeds in poorly drained soils[200]. Succeeds in full sun or light shade[[188]. A very ornamental[1] and free-flowering plant[182]. Plants in this genus are notably resistant to honey fungus[200].

5.2.672 Clematis columbiana

Rock Clematis

4 tin 8 cyuc 0 kcaak 0 tcan 1 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyk hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Clematis columbiana* is a deciduous Climber growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no reports of toxicity have been seen for this species, some if not all members of this genus are mildly poisonous. The toxic principle is dissipated by heat or by drying[65].

tcanta Hair Insulation TinderThe seed floss makes an excellent tinder for starting fires, a spark from a flint will quickly ignite it[212]. The seed floss can be used as an insulation in shoes etc[212]. An infusion of the leaves alone, or the leaves and stems, has been used as a hair wash to prevent gray hair[257].

(has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista All parts of the plant are highly poisonous[9, 10, 19, 65, 76, 222]. Unsafe for self-medication. Monitoring by a physician to determine correct dose recommended. For overdose give activated charcoal. Can be fatal especially to children [301].

tcanta Dye PreservativeAn infusion of the plant prolongs the life of cut flowers[54]. Root crops growing near this plant store better[54]. An apple-green dye is obtained from the flowers[168]. Cut flower. Cultivars have gained the Royal Horticultural Society's Award of Garden Merit.

dwatta Cardiac Diuretic Homeopathy Stimulant TonicThe foxglove is a widely used herbal medicine with a recognised stimulatory effect upon the heart. It is also used in allopathic medicine in the treatment of heart complaints. It has a profound tonic effect upon a diseased heart, enabling the heart to beat more slowly, powerfully and regularly without requiring more oxygen[254]. At the same time it stimulates the flow of urine which lowers the volume of the blood and lessens the load on the heart[254]. The plant contains cardiac glycosides (including digoxin, digitoxin and lanatosides). Digitoxin rapidly strengthens the heartbeat but is excreted very slowly. Digoxin is therefore preferred as a long-term medication[254]. The leaves are cardiac, diuretic, stimulant and tonic[4, 9, 21, 46, 171]. The leaves should only be harvested from plants in their second year of growth, picked when the flowering spike has grown and about two thirds of the flowers have opened[4]. Harvested at other times, there is less of the medicially active alkaloid present[4]. The seed has also been used in the past[4]. The leaves also have a very beneficial effect on the kidneys, they are strongly diuretic and are used with benefit in the treatment of dropsy[4]. Great care should be exercised in the use of this plant, the therapeutic dose is very close to the lethal dose[222]. See also the notes above on toxicity. A homeopathic remedy is made from the leaves[9]. It is used in the treatment of cardiac disorders[9].

nrakta Western Europe, including Britain, from Norway to Spain and Sardinia. ksacta Acid soils in woods, heaths, mountain grasslands etc[9, 17].

propta Seed - surface sow early spring in a cold frame. The seed usually germinates in 2 - 4 weeks at 20°C[175]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. If you have sufficient seed it can be sown outdoors in situ in the spring or autumn.

nwatta Landscape Uses:Border, Container, Massing, Specimen, Woodland garden. Easily grown in ordinary garden soil, especially if it is rich in organic matter[1]. Prefers a light dry soil in semi-shade[17] but succeeds in full sun if the soil is moist[200]. Grows well in acid soils[17]. Plants are hardy to about -25°C[187]. The foxglove is a very ornamental plant that is easily naturalized in the semi-shade of a woodland[1]. It contains glycosides and forms the basis of an important heart medicine for which it is cultivated commercially[4]. This species is commonly used by herbalists, whereas *D. lanata* is more commonly grown for supplying the pharmaceutical industry[238]. The plant contains much greater concentrations of the medicially active ingredients when it is grown in a sunny position[115]. The flowers are very attractive to bees[4, 24]. Individual plants can produce up to 2 million seeds[4]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. A good companion plant, it stimulates the growth of nearby plants, growing well with pine trees[18, 20, 54]. Special Features:Attractive foliage, Not North American native, Naturalizing, All or parts of this plant are poisonous, Suitable for cut flowers. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fibrous dividing into a large number of fine roots [2-1].

5.2.717 Astrantia major

Great Masterwort

4 tin 9 cyuc 0 kcaak 0 tcan 1 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyk hpa7tli flatprikliwis hpa7tmwatli fyfjxre7t hjonli

drutta *Astrantia major* is a PERENNIAL growing to 0.8 m (2ft 7in) by 0.5 m (1ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to July and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Beetles, insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

dwatta Diuretic PurgativeA decoction of the root is purgative[7]. The root is harvested in summer to early autumn and can be dried for later use[7]. An infusion of the whole plant is a gentle diuretic[7].

nrakta C. and E. Europe. Naturalized in Britain. ksacta Moist woodlands and the banks of streams[7].

propta Seed - best sown in a cold frame as soon as it is ripe[200]. Sow stored seed as early in the year as you can obtain it. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. If you have sufficient seed then it can be sown in situ either as soon as it is ripe or in the following spring. Division in spring. Large clumps can be planted out straight into their permanent positions. Smaller clumps are best potted up and kept in a cold frame until they are growing away well and can then be planted out in the summer.

nwatta Landscape Uses:Alpine garden, Border, Massing, Seashore, Woodland garden. Prefers a fertile moisture-retentive soil[200]. Succeeds in most well-drained soils[233] in full sun or part shade[200, 233]. Succeeds in an open woodland and along the sides of streams so long as the soil is well above the water level[200]. Plants are hardy to at least -17°C[200]. Plants spread by means of underground runners[233]. There are some named varieties, selected for their ornamental value[200]. The flowers are sometimes dried and used for winter decoration[200]. Special Features:Attractive foliage, Suitable for cut flowers, Suitable for dried flowers, Attractive flowers or blooms.

5.2.718 Aster novi

Michaelmas Daisy, New York Aster

4 tin 8 cyuc 0 kcaak 2 tcan 0 dwat 1.2 m hkuc hmimhtut cyutli tcup hwicli hyhrasjlutnyk hpa7tli flatprikliwis hpa7tmwatli fyfjxre7t hjonli

drutta *Aster novi-belgii* is a PERENNIAL growing to 1.2 m (4ft) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 2. It is in flower from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles, Lepidoptera (Moths and Butterflies). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

tcanta Landscape Uses: Woodland Garded ;Border, Rock garden, Seashore. A forest garden plant that can be grown in dappled shade. Attracts wildlife.

nrakta Eastern N. America. Naturalized in Britain[17]. ksacta Damp thickets, meadows and shores, usually within 100 miles of the sea[43, 187].

propta Seed - surface sow in spring in a cold frame. Do not allow the compost to become dry. Pre-chilling the seed for two weeks can improve germination rates[134]. Germination usually takes place within 2 weeks at 20°C[134]. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn[200]. Very easy, larger divisions can be planted straight into their permanent positions whilst smaller clumps are best potted up and kept in a cold frame until they are growing away well. Basal cuttings in late spring. Harvest the shoots when they are about 10 - 15cm long with plenty of underground stem. Pot them up into individual pots and

used - they are anodyne, antispasmodic, mildly diuretic, hallucinogenic, hypnotic, mydriatic, narcotic and sedative[4, 9, 13, 21, 100, 165, 192, 218]. The plant is used internally in the treatment of asthma, whooping cough, motion sickness, Meniere's syndrome, tremor in senility or paralysis and as a pre-operative medication[238]. Henbane reduces mucous secretions, as well as saliva and other digestive juices[254]. Externally, it is used as an oil to relieve painful conditions such as neuralgia, dental and rheumatic pains[238, 254]. The leaves should be harvested when the plant is in full flower and they can then be dried for later use[4]. There is an annual and a biennial form of this species, both can be used medicinally but the biennial form is considered to be superior[4]. This is a very poisonous plant that should be used with great caution, and only under the supervision of a qualified practitioner[21, 238]. See the notes above on toxicity. The seed is used in the treatment of asthma, cough, epilepsy, myalgia and toothache[218]. The seeds are used in Tibetan medicine, they are said to have a bitter, acrid taste with a neutral and poisonous potency[241]. Anthelmintic, antitumor and febrifuge, they are used in the treatment of stomach/intestinal pain due to worm infestation, toothache, inflammation of the pulmonary region and tumours[241].

nrakta Much of Europe, including Britain, south and east to N. Africa and W. Asia. ksacta By the walls of fields, waste ground, near buildings and in stony places from low-lying ground near the sea to lower mountain slopes[7].

propta Seed - sow summer in a cold frame and pot on as soon as possible before the taproot is too long[200].

nwatta Prefers a sunny position[4] and a dry soil[19]. Succeeds in ordinary garden soil[1] but prefers an alkaline soil[200]. Plants succeed in sandy spots near the sea[4]. Cultivated commercially as a medicinal plant[57], only the biennial form is considered official[4]. Grows well in maritime areas, often self-sowing freely[200]. Older plants do not transplant well due to a brittle taproot[200]. The growing plant inhibits the growth of clover[18]. The flowers emit a sickly fishy smell[245].

5.2.714 Echinacea pallida

Cone Flower, Pale purple coneflower

4 tin 8 cyuc 0 kcak 0 tcan 5 dwat 1 m hkuc
htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprklwis hpa7tmwatli xre7t hjonli

drutta Echinacea pallida is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista Possible suppression of immunity with habitual use. High doses over 1000 mg may cause dizziness. Use of herb for 10-14 days recommended followed by a short break.

dwatta Adaptogen Alternative Antiseptic Appetizer Depurative Diaphoretic Digestive Sialagogue UrinaryPlants in this genus were probably the most frequently used of N. American Indian herbal remedies, though this species is considered to be less active than *E. angustifolia*[222]. They had a very wide range of applications and many of these uses have been confirmed by modern science. The plant has a general stimulatory effect on the immune system and is widely used in modern herbal treatments[222]. There has been some doubt over the ability of the body to absorb the medicinally active ingredients orally (intravenous injections being considered the only effective way to administer the plant), but recent research has demonstrated significant absorption from orally administered applications[222]. In Germany over 200 pharmaceutical preparations are made from Echinacea[222]. The roots and the whole plant are considered particularly beneficial in the treatment of sores, wounds, burns etc, possessing cortisone-like and antibacterial activity[222]. The plant was used by N. American Indians as a universal application to treat the bites and stings of all types of insects[213]. An infusion of the plant was also used to treat snakebites[213]. The plant is adaptogen, alternative, antiseptic, depurative, diaphoretic, digestive, sialagogue[4, 21, 61, 165, 213]. It is harvested in the autumn and dried for

later use[238]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Echinacea for common cold, cough and bronchitis, fevers and cold, urinary tract infections, inflammation of the mouth and pharynx, increase resistance to infection, wounds and burns (see [302] for critics of commission E).

nrakta N. America - Michigan to Nebraska and south to Texas. ksacta Dry soils[235] on prairies and barrens[43]. Sandy open woods and prairies in Texas[274].

propta Seed - sow March/April in a greenhouse and only just cover the seed[175, K]. Diurnal temperature fluctuations aid germination[175]. The seed usually germinates in 10 - 21 days at 25°C[175]. Prick out the seedlings into individual pots once they are large enough to handle and grow them on in the greenhouse for the first summer. Plant them out in the late spring or early summer of the following year and give them some protection from slugs at least until they are established[K]. Division in spring or autumn[111]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring. Root cuttings, October in a frame[200].

nwatta Succeeds in ordinary garden soil[111] but prefers a deep rich loam with plenty of leafmold[1] and a sunny position[175]. Slugs love this plant[K].

5.2.715 Chamaecrista fasciculata

Golden Cassia, Partridge pea

4 tin 8 cyuc 0 kcak 1 tcan 0 dwat 1 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprklwis hpa7tmwatli xre7t hjonli

drutta Chamaecrista fasciculata is a ANNUAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from August to October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The plant is considered toxic for grazing animals[274].

tcanta Soil stabilizationPlants have an extensive root system and are used to stabilize soils. Grown as an ornamental or for honey production.

nrakta Eastern, Central and South-eastern N. America. ksacta Open woods and prairies, disturbed areas, often on sandy soils[274].

propta Seed - scarify and then pre-soak the seed for 2 - 3 hours in warm water before sowing it from early spring to early summer in a warm greenhouse[138]. The seed usually germinates in 1 - 12 weeks at 23°C[138]. Prick out the seedlings into individual pots once they are large enough to handle and grow them on in the greenhouse. Do not plant them out until the following spring[138]. Division as growth commences in spring[11]. Cuttings of moderately ripe wood, July in a frame[1].

nwatta Succeeds in most well-drained soils but prefers an open sandy loam in a sunny sheltered position[1, 200]. Established plants are drought tolerant[200]. Succeeds in light shade, but the plant is much less vigorous when grown in dry shade[200]. Young plants should be mulched each winter until they are well established[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

5.2.716 Digitalis purpurea

Foxglove, Purple foxglove, Common Foxglove

4 tin 8 cyuc 0 kcak 2 tcan 4 dwat 1.2 m hkuc
hmimhtut cyutli kyuctup hwicli hrasjlutnyik hpa7tli flatprklwis hpa7tmwatli xre7t hjonli

drutta Digitalis purpurea is a BIENNIAL growing to 1.2 m (4ft) by 0.6 m (2ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to September, and the seeds ripen from August to October. The species is hermaphrodite

dwatta Eczema Foot care Salve SkinA poultice of the pounded, dampened leaves has been applied to the feet to treat sweaty feet[257]. A cold infusion of the plant can be used as a lotion on swollen knees and ankles[257]. The plant has been used as a head wash and to treat scabs and eczema[257].

nrakta Western N. America - British Columbia to Colorado and Oregon. ksacta Dry to moist soils of woods and thickets, from valleys to around 2,500 metres in the mountains[212].

propta Seed - best sown as soon as it is ripe in a cold frame[164, 200]. Sow stored seed as soon as it is obtained in a cold frame. Pre-soak the seed for 12 hours in warm water and remove as much of the tail and outer coat as possible[164]. A period of cold stratification is beneficial[164]. The seed germinates in 1 - 9 months or more at 20°C[164]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for the first winter. Plant out in late spring or early summer, after the last expected frosts. Internodal cuttings of soft to semi-ripe wood, late spring in sandy soil in a frame[200]. Layering of old stems in late winter or early spring[200]. Layering of current seasons growth in early summer[200].

nwatta Prefers a deep moist soil with its roots in the shade[11, 200]. Dislikes poorly-drained heavy clay soils, but grows well in clay if grit is added for drainage[11, 200]. Dislikes light sandy soils[11]. Does well on chalk[1]. Succeeds in acid as well as alkaline soils[200]. When planting out, in order to avoid the disease 'clematis wilt', it is best to plant the rootball about 8cm deeper in the soil. This will also serve to build up a good root crown of growth buds[200]. A twining plant[182]. The leafstalks wrap themselves around twigs and branches for support. When a side of the stalk touches an object, the growth on that side slows down whilst the other side grows at its normal rate - this causes the leaf stalk to entwine the object it is touching[212]. Plants in this genus are notably resistant to honey fungus[200]. Plants seem to be immune to the predations of rabbits[233]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

5.2.673 Philadelphus lewisii

Mock Orange, Lewis' mock orange

4 tin 8 cyuc 0 kcak 0 tcan 1 dwat 3.6 m hkuc
hmimhtut cyutli tcup hwicli hyishrasjlutnyikfrip hpa7tli flatprklwis hpa7tmwatli xre7t hjonli

drutta Philadelphus lewisii is a deciduous Shrub growing to 3.6 m (11ft 10in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

tcanta Soap WoodThe leaves and flowers are rich in saponins, when crushed and mixed with water they produce a lather that is an effective cleanser, used on the body, clothes etc[99, 169, 257]. You can wash your hands by merely picking a couple of leaves or a bunch of blossom, wetting your hands and then rubbing the plant material vigorously as if it was a bar of soap[K]. This soap is a very gentle cleanser that does not remove the body's natural oils, but does remove dirt. It is not very effective against oil[K]. An infusion of the bark can also be used[99, 169]. The stems can be used in making fine coiled baskets[257]. Wood - strong, very hard. Used for tool handles[99].

dwatta Antihæmorrhoidal Antirheumatic Eczema Poultice SkinThe dried powdered leaves, or the powdered wood, has been mixed with pitch or oil and used as a rub on sores and swollen joints[257]. A poultice of the bruised leaves has been used to treat infected breasts[257]. A strained decoction of the branches, sometimes with the flowers, has been used as a soaking solution in the treatment of sore chests, eczema and bleeding hæmorrhoids[257].

nrakta Western N. America - British Columbia to Oregon. ksacta Gullies, water courses, rocky cliffs, talus slopes and rocky hillsides of sagebrush deserts[60].

propta Seed - best if given 1 months cold stratification[113]. Sow February in a light position in a cold frame.

When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm long side-shoots, July/August in a shaded frame. Plant out in spring. High percentage[78]. Cuttings of mature wood of the current year's growth, 15 - 25cm with a heel, December in a sheltered bed outdoors. Fair to good percentage[78]. Layering in summer. Very easy.

nwatta An easily grown plant, succeeding in any moderately fertile soil, and also in thin soils over chalk[200]. Tolerates poor soils[200]. Grows well in heavy clay soils. Succeeds in semi-shade but prefers a position in full sun where it will flower more freely[182, 200]. Plants are hardy to about -15°C. Some named forms have been developed for their ornamental value[182]. Plants are very tolerant of pruning, one third of the stems can be cut down to the ground each year in order to promote fresh growth and heavier flowering[202]. A very ornamental plant with aromatic flowers[182, 200]. This plant is the State flower of Idaho[212].

5.2.674 Cotoneaster simonsii

Simons' cotoneaster

4 tin 8 cyuc 0 kcak 2 tcan 0 dwat 3 m hkuc
hmimhtut cyutli kyuctup hwicli hyishrasjlutnyikfrip hpa7tli flatprklwis hpa7tmwatli xre7t hjonli

drutta Cotoneaster simonsii is an evergreen Shrub growing to 3 m (9ft) by 2 m (6ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year; in flower from May to July, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies, midges. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. It can tolerate atmospheric pollution.

tcanta Dye Hedge HedgeA rose-tan dye is obtained from the fruit[168]. Can be grown as a medium to tall informal hedge[1, 11, 29, 200]. When close trimmed it makes an excellent dense hedge[182].

nrakta E. Asia - Himalayas, in Assam. Naturalized in many places in Britain[17]. ksacta Scrub, hedgerows and rocky places on calcareous soils[200].

propta Seed. Members of this genus hybridize freely so, if you require seed that breeds true, it is important to obtain it from a known wild source or from a controlled fertilization of garden plants. The seed is best sown as soon as it is ripe in the autumn in a cold frame, when it will usually germinate in the spring[11, 200]. Stored seed germinates faster if given 3 months warm stratification at 15°C and then 3 months cold stratification at 4°C[164]. The seed usually germinates within 1 - 18 months at 15°C but it can take 2 years[164]. Pot the seedlings up as soon as they are large enough to handle and plant them out into nursery beds or into their permanent positions when they are more than 10cm tall. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200].

nwatta An easily grown plant, it prefers a good soil but also does well in poor soils[1, 11, 200]. It thrives in lime and is also happy in peaty soils[1]. It succeeds in any soil that is not marshy or waterlogged[11, 200]. Succeeds in dry soils[188]. Grows well in heavy clay soils. Succeeds in full sun or semi-shade but does not fruit so freely in a shady position[11, 200]. Tolerates atmospheric pollution[200]. A very hardy plant, tolerating temperatures down to about -20°C[184]. A fairly fast-growing species[202]. Hybridizes freely with other members of this genus[200]. The flowers, when inhaled near to, have an unpleasant smell like decaying fish[245]. They are very attractive to bees whilst the fruit is a good winter food source for many species of birds[200]. Trees are notably susceptible to honey fungus[200]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

5.2.675 Baccharis halimifolia

Bush Groundsel, Eastern baccharis, High Tide Bush, Sea Myrtle, Salt Bush
4 tlin 8 cyuc 0 kcaak 0 tcan 1 dwat 3.5 m hkuc
hmtut cyutli kyucup hwicli hyishrasjltunyk hpa7tli flatprikliw
wissliphom hpa7tmwatli nyanhjen hjonli

drutta Baccharis halimifolia is a deciduous Shrub growing to 3.5 m (11ft) by 3.5 m (11ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline and saline soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

pcista The plant is potentially toxic to livestock[274].

tcanta Fuel Hedge Hedge Soil stabilizationA good fast-growing hedge for exposed maritime conditions[11, K]. It retains its leaves into the new year but is rather bare in late winter[K]. Plants have an extensive root system and can be grown on sand or thin coastal soils in order to bind the soil[200]. Resinous secretions on the leaves and wood make this a useful fuel[11]. It is a fairly small plant though and would not be a very productive source.

dwatta DemulcentThe plant is used as a palliative and demulcent in consumption and cough[207].

nrakta Eastern N. America - Massachusetts to Florida and Texas. ksacta Open woods, thickets and borders of marshes near the coast[43], often in saline soils[235].

propta Seed - no pre-treatment is required[113]. Surface sow in pots a cold frame in the spring, do not let the compost dry out. Germination usually takes place within 1 - 2 weeks[113]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame. Very easy[K]. Cuttings of mature wood of the current seasons growth, November in a frame. Easy[K].

nwatta Landscape Uses:Seashore. Succeeds in a sunny position in any well-drained soil[11, 188], from heavy clays to pure sands[113]. Tolerates saline conditions and dry soils[188, 200]. A useful shrub for coastal situations, resisting maritime exposure[11]. Plants are hardy to about -15°C[200]. A fast-growing plant, it is very tolerant of pruning and can be cut right back to the base if required[K]. The presence of this plant growing wild was supposed to indicate areas where oil might be found[207]. Dioecious. Male and female plants must be grown if seed is required. Special Features:North American native, All or parts of this plant are poisonous, Wetlands plant, Attractive flowers or blooms.

5.2.676 Menispermum canadense

Canada Moonseed, Common moonseed
4 tlin 8 cyuc 0 kcaak 0 tcan 2 dwat 3.6 m hkuc
hmimhtut cyutli tcup hwicli hrasjltunyk hpa7tli flatprikliw
hpa7tmwatli nyanhjen hjonli

drutta Menispermum canadense is a deciduous Climber growing to 3.6 m (11ft 10in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to July, and the seeds ripen from October to November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). . The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All parts of the plant are poisonous[21, 95, 159, 222]. The fruit has been known to cause death in children[207].

dwatta Bitter Diuretic Laxative Purgative TonicCanada moonseed has occasionally been used in the past for its medicinal virtues, though it is little, if at all, used in modern herbalism. The roots are a bitter tonic, diuretic, laxative, nervine, purgative (in large doses), stomachic and tonic[4, 21, 46, 218]. A tea made from the root has been used in the treatment of indigestion, arthritis, bowel disorders and as a blood cleanser[222]. The root is applied externally as a salve on chronic sores[222]. Use with caution[21], see notes above on toxicity.

nrakta Eastern N. America - Quebec and New England to Georgia, west to Arkansas and Oklahoma. ksacta Moist woods and hedges near streams[43]. Deciduous woods and thickets, along streams, bluffs and rocky hillsides, fencerows, shade tolerant from sea level to 700 metres[270].

propta Seed - sow late winter in a greenhouse[78, 113]. Two months cold stratification speeds up germination[113] so it might be better to sow the seed as soon as it is ripe in a cold frame[K]. Germination is usually good[78]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of mature wood, autumn in a frame[200]. Division of suckers in early spring[78, 113]. The suckers can be planted out direct into their permanent positions, though we prefer to pot them up and grow them on in light shade in a greenhouse or cold frame until they are established[K].

nwatta Succeeds in any moderately fertile soil that does not dry out excessively in summer, in sun or partial shade[200]. Prefers a position in full sun[219]. This species is hardy to about -30°C, but, due to a lack of summer heat, the plants usually produce soft growth in mild maritime areas and this can be cut to the ground at temperatures around -5 to -10°C[200]. The plants do not require pruning, but can benefit from being cut back to ground level every 2 - 3 years in order to keep them tidy[219]. A vigorous and fast-growing climbing plant that twines around supports, it also spreads freely by underground suckers[11, 182, 219]. Dioecious. Male and female plants must be grown if seed is required.

5.2.677 Magnolia liliiflora

Mu-Lan, Woody Orchid, Lily Magnolia
4 tlin 9 cyuc 0 kcaak 0 tcan 3 dwat 3 m hkuc
hmimhtut cyutli tcup hwicli hrasjltunyk hpa7tli flatprikliw
hpa7tmwatli xre7t hjonli

drutta Magnolia liliiflora is a deciduous Shrub growing to 3 m (9ft) by 4 m (13ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from April to June, and the seeds ripen from September to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Beetles. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. It can tolerate atmospheric pollution.

dwatta Analgesic Anodyne Carminative Febrifuge Sedative TonicThe flowers and unopened flower buds are analgesic, anodyne, carminative, febrifuge, sedative and tonic[147, 218]. The main effect of this herb is to constrict blood vessels in the nasal passages and so it is taken internally in the treatment of sinusitis, allergic rhinitis and colds with a runny nose or catarrh[238]. In excess it can cause dizziness[238]. This herb is incompatible with Astragalus membranaceus[238]. The flowers are harvested in the spring and can be used fresh or dried[238].

nrakta E. Asia - C. China. ksacta Slopes and forests edges at elevations of 300 - 1600 metres in Fujian, Hubei, Sichuan and NW Yunnan Provinces[266].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed must be kept cold over the winter and should be sown in late winter in a cold frame[200]. The seed usually germinates in the spring but it can take 18 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for at least their first winter. They can be planted out into their permanent positions when they are more than 15cm tall, though should be well mulched and

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

pcista The plant contains saponins[13]. Although toxic, these substances are very poorly absorbed by the body and so tend to pass through without causing harm. They are also broken down by thorough cooking. Saponins are found in many plants, including several that are often used for food, such as certain beans. It is advisable not to eat large quantities of food that contain saponins. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K]. Do not use for more than 2 weeks. Avoid during pregnancy.

tcanta SoapA soap can be obtained by boiling the whole plant (but especially the root) in water[6, 13]. It is a gentle effective cleaner[7, 95], used especially on delicate fabrics that can be harmed by modern synthetic soaps (it has been used to clean the Bayeaux tapestry). It effects a lustre in the fabric[171]. The best soap is obtained by infusing the plant in warm water[169]. The roots can be dried and stored for later use[169]. The plant is sometimes recommended as a hair shampoo, though it can cause eye irritations[238]. The plant spreads vigorously and can be used as a ground cover when planted about 1 metre apart each way[208].

dwatta Alterative Antipruritic Antirheumatic Antiscrophulatic Cholagogue Cytotoxic Depurative Diaphoretic Diuretic Expectorant Purgative Skin Sterutatory TonicSoapwort's main medicinal use is as an expectorant. Its strongly irritant action within the gut is thought to stimulate the cough reflex and increase the production of a more fluid mucus within the respiratory passages[254]. The whole plant, but especially the root, is alterative, antiscrophulatic, cholagogue, depurative, diaphoretic, mildly diuretic, expectorant, purgative, sternutatory and tonic[4, 7, 9, 13, 21, 218]. A decoction of the whole plant can be applied externally to treat itchy skin[4, 201, 238]. The plant has proved of use in the treatment of jaundice and other visceral obstructions[4], but is rarely used internally in modern herbalism due to its irritant effect on the digestive system[238]. When taken in excess, it destroys red blood cells and causes paralysis of the vasomotor centre[238]. See also the notes above on toxicity[4, 7]. The root is harvested in the spring and can be dried for later use[7]. One of the saponins in this plant is proving of interest in the treatment of cancer, it is cytotoxic to the Walker Carcinoma in vitro[218]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Saponaria officinalis Soapwort. Bouncingbet for coughs/bronchitis (see [302] for critics of commission E).

nrakta Europe, including Britain, from Scandinavia south and east to Spain and temperate Asia. ksacta Fields, roadsides and along the banks of streams[7].

propta Seed - best if given a short cold stratification. Sow autumn or late winter in a cold frame. The seed usually germinates within 4 weeks. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in early summer. Division in spring or autumn. Very easy, it can be successfully done at any time in the growing season if the plants are kept moist until they are re-established. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Landscape Uses:Border, Rock garden. Succeeds in any moderately fertile well-drained soil in sun or semi-shade[200]. Prefers a neutral to alkaline soil[238]. Hardy to about -20°C[187]. A very ornamental plant[1], soapwort is often grown in the herb garden and is sometimes cultivated for the soap that can be obtained from the roots. There are some named forms, usually with double flowers, that have been selected for their ornamental value[187]. Plants can be very invasive when grown in good conditions[K]. Soapwort should not be grown next to a pond with amphibians or fish in it since if the plant trails into the water it can cause poisoning[238]. The flowers are slightly scented with a sweet aroma that has an undertone of clove[245]. Hybridizes with other members of this genus[200]. A good moth plant[13, 24]. Special Features:Edible, Fragrant foliage, Not North

American native, Invasive, Naturalizing, Attracts butterflies, Suitable for cut flowers, Fragrant flowers.

5.2.712 Amianthium muscitoxicum

Fly Poison
4 tlin 8 cyuc 0 kcaak 0 tcan 1 dwat m hkuc
hmimhtut cyutli tcup hwicli hrasjltunyk hpa7tli flatprikliw
hpa7tmwatli dyatxre7t hjonli

drutta Amianthium muscitoxicum is a BULB growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from May to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Beetles. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All parts of the plant are highly toxic, containing the alkaloids jervine and amianthine[200, 270].

tcanta InsecticideRoot extracts mixed with molasses or honey have been used as a housefly insecticide[270].

dwatta SkinNative Cherokee used the plant as a dermatological cure for itch[270].

nrakta Southeastern N. America - New York to Florida. ksacta Dry or mesic wooded slopes, meadows and savannas from sea level to 1500 metres[270].

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

nwatta Prefers a deep rich moisture-retentive soil in partial shade[200]. Plants like plenty of moisture in the spring and summer when they are in full growth[200]. Grows well in a woodland garden[200].

5.2.713 Hyoscyamus niger

Henbane, Black henbane
4 tlin 8 cyuc 0 kcaak 0 tcan 4 dwat 1 m hkuc
htut cyutli kyucup hwicli hrasjltunyk hpa7tli flatprikliw
hpa7tmwatli xre7t hjonli

drutta Hyoscyamus niger is an ANNUAL/BIENNIAL growing to 1 m (3ft 3in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

pcista All parts of the plant are very toxic[7, 10, 19, 65, 76]. Symptoms of poisoning include impaired vision, convulsions, coma and death from heart or respiratory failure[238].

tcanta RepellentThe leaves scattered about a house will drive away mice[207].

dwatta Anodyne Anthelmintic Antispasmodic Antitumor Diuretic Epilepsy Febrifuge Hallucinogenic Hypnotic Mydriatic Narcotic Sedative UrinaryHenbane has a very long history of use as a medicinal herb, and has been widely cultivated to meet the demand for its use[4]. It is used extensively as a sedative and pain killer and is specifically used for pain affecting the urinary tract, especially when due to kidney stones[254]. Its sedative and antispasmodic effect makes it a valuable treatment for the symptoms of Parkinson's disease, relieving tremor and rigidity during the early stages of the disease[254]. This species is the form generally considered best for external use, whilst the white henbane (*H. albus*) is considered the most appropriate for internal use[4]. All parts of the plant, but especially the leaves and the seeds, can be

dwatta Skin VermifugeA drink made from the crushed seed is used as a vermifuge[207]. It is intensely bitter but has been used on children and expels the worms both by vomit and by excretion[4, 207]. A decoction of the root has been applied to skin eruptions[257].

nrakta N. America - Newfoundland to New Jersey, Pennsylvania and Missouri, west to the Pacific coast. ksacta Found in many habitats from southern British Columbia to California at elevations of 750 - 3600 metres[155].

propta Seed - sow in situ in the spring[200]. Germination should take place within 3 weeks.

nwatta Requires a well-drained soil and a sunny position[200]. Dislikes acid soils[200]. Tolerates poor soils[200].

5.2.708 Silphium terebinthinaceum

Prairie Dockm, Prairie rosinweed, Lucy Braun's rosinweed 4 tlin 8 cyuc 0 kcak 0 tcan 2 dwat 1.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Silphium terebinthinaceum is a PERENNIAL growing to 1.5 m (5ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from July to August, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

tcanta GumA gum or resin that is obtained from the stem can be chewed to cleanse the mouth and teeth[207].

dwatta Diuretic Emetic Expectoant Tonic VermifugeA tea made from the roots is vermifuge and a tonic for general debility[4, 61, 222]. A tea made from the leaves is emetic, it has been used in the treatment of coughs, lung ailments and asthma[4, 61, 222]. A resin in the plant is diuretic[4, 61, 222].

nrakta Eastern N. America - Ontario to Tennessee, Ohio and Indiana. ksacta Prairies, dry woods and glades[222, 235].

propta Seed - best sown as soon as it is ripe in a greenhouse[200]. Prick out the seedlings into individual pots as soon as they are large enough to handle and plant them out in the summer. Division in spring[188]. This is very difficult due to the deep and extensive root system.

nwatta Succeeds in any ordinary garden soil[1]. Prefers a deep moisture retentive moderately fertile soil that is not too nitrogen rich, in sun or dappled shade[200]. Succeeds in the wild or woodland garden[200]. Plants have a deep and extensive root system which makes transplanting difficult[200].

5.2.709 Geranium macrorrhizum

Bigroot Geranium

4 tlin 8 cyuc 0 kcak 0 tcan 1 dwat m hkuc pcmimimhtut cyutli hgatkycutcup hwicli hrasjlutnyik hpa7tli priklwisslip hpa7tmwatli xre7t hjonli

drutta Geranium macrorrhizum is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.6 m (2ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

tcanta Essential Pot-pourriThe very aromatic leaves have been used in the past as a source of geranium oil[187]. They are used in pot-pourri and perfumery[244]. A good dense ground cover plant[197, 200]. A very effective weed smotherer[187, 190]. Plants grow rampantly, rooting as they spread[208]. They should be spaced about 60cm apart each way[208].

dwatta AphrodisiacAphrodisiac[61].

nrakta C. Europe. A garden escape in Britain in S. Devon. ksacta Amongst limestone rocks, screens, in woods

and scrub to 2100 metres[187]. Shady places, especially in mountains[50].

propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn. Very easy, virtually every bit of a divided plant, whether it has roots or not, will grow away and produce roots[190]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Easily grown in dry or moist situations, in sun or light shade[187, 200]. Succeeds even in deep shade[208]. Tolerates a wide range of soil types, succeeding in only moderately fertile retentive soil[200]. Calcicole[50]. Established plants are drought resistant[190]. A very ornamental plant, there are many named varieties[187]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233].

5.2.710 Dipsacus sativus

Fuller's Teasel, Indian teasel

4 tlin 8 cyuc 0 kcak 2 tcan 2 dwat 1.8 m hkuc htut cyutli tcup hwicli hrasjlutnyikfrp hpa7tli flatprikliwis hpa7tmwatli fyfxre7t hjonli

drutta Dipsacus sativus is a BIENNIAL/PERENNIAL growing to 1.8 m (6ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from July to August, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

tcanta Brush DyeThe dried flower heads are used for carding wool and as a clothes brush for raising the nap on woollen cloth[7, 46, 74, 169]. They are harvested with about 20cm of stem as soon as the flowers wither and are dried for later use[4]. A blue dye is obtained from the dried plant, an indigo substitute[74]. It is water soluble[74]. The colour is yellow when mixed with alum[148].

dwatta Cancer Diaphoretic Diuretic Homeopathy Stomachic WartsThe root is diaphoretic, diuretic and stomachic[7]. An infusion is said to strengthen the stomach, create an appetite, remove obstructions of the liver and treat jaundice[4]. The root is harvested in early autumn and dried for later use[7]. The plant has a folk history of use in the treatment of cancer, an ointment made from the roots is used to treat warts, wens and whitlows[4, 218]. A homeopathic remedy is made from the flowering plant[7]. It is used in the treatment of skin diseases[7].

nrakta Of uncertain origin. An occasional escape from cultivation in Britain[17]. ksacta Not known in a truly wild condition.

propta Seed - best sown in early spring in situ[115]. The seed can also be sown from February to May or from August to October. All but the earlier sowings can be made outdoors.

nwatta Succeeds in most soils[1] but prefers clay[17]. Prefers a deep rich soil[169]. Requires a sunny position[169]. A good butterfly plant[24]. Fuller's teasel is occasionally cultivated for its seed head, which is used for carding cloth[1, 2, 46]. The flowering heads are also much prized by flower arrangers because they keep their colour almost indefinitely when dried[7].

5.2.711 Saponaria officinalis

Soapwort, Bouncingbet

4 tlin 8 cyuc 0 kcak 0 tcan 3 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Saponaria officinalis is a PERENNIAL growing to 1 m (3ft 3in) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from July to September, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Lepidoptera (Moths and Butterflies). It is noted

given some protection from winter cold for their first winter or two outdoors. Layering in early spring[200].

nwatta Landscape Uses:Border. Specimen. Best grown in a warm position in a moderately rich free soil of an open texture[1]. Prefers a neutral to acid soil but tolerates alkaline soils so long as they are deep and rich in humus[188]. Plants cannot be grown on limy or chalky soils[219]. The branches are brittle so a sheltered position is required[200]. This species is said to be fairly wind tolerant[200]. It is very tolerant of atmospheric pollution[200]. Plants are hardy to about -20°C[200], but they require the protection of a wall when grown in northern Britain[11]. The fleshy roots are easily damaged and any transplanting is best done during a spell of mild moist weather in late spring[182]. The flowers, which start to be produced when the plant is less than a metre tall, are deliciously scented[245]. The young wood is aromatic[219]. Special Features:Attractive foliage, Extended bloom season in Zones 9A and above, Fragrant flowers, Blooms are very showy.

5.2.678 Rhus radicans

Poison Ivy

4 tlin 8 cyuc 0 kcak 0 tcan 1 dwat 2.5 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli nyanhjen hjonli

drutta Rhus radicans is a deciduous Climber growing to 2.5 m (8ft 2in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to June, and the seeds ripen from September to November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista This plant contains toxic substances and skin contact with it can cause severe irritation to some people[11]. The sap is extremely poisonous[11]. The sap contains 3-N pentadecylcatechol. Many people are exceedingly sensitive to this, it causes a severe spreading dermatitis. The toxins only reach the skin if the plant tissues have been damaged, but even indirect contact can cause severe problems[200].

tcanta Dye Ink Mordant OilThe leaves are rich in tannin. They can be collected as they fall in the autumn and used as a brown dye or as a mordant[169]. An oil is extracted from the seeds[4]. It attains a tallow-like consistency on standing and is used to make candles. These burn brilliantly, though they emit a pungent smoke[4]. An excellent marking ink is obtained from this plant[11].

dwatta Hepatic Skin TonicPoison ivy has occasionally been used medicinally, though it is an extremely poisonous plant and great caution should be exercised. Any herbal use should only be undertaken under the supervision of a qualified practitioner. See also the notes above on toxicity. This plant has been used in the past by physicians in the treatment of paralysis and liver disorders[222]. A decoction of the leaves has been used as a tonic and rejuvenator[257]. The whole or the broken leaves have been rubbed over the skin to treat boils and skin eruptions[257]. The leaves have been rubbed on skin that has been affected by a poison ivy reaction[257].

nrakta Eastern N. America - Quebec to Florida, west to Texas.. ksacta Woods, on rocky slopes and in wooded swamps[43].

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

nwatta Succeeds in a well-drained fertile soil in full sun[11, 200]. The young growth in spring can be damaged by late frosts. A fast-growing but short-lived species in the wild[22]. It has brittle branches and these can be broken off in strong winds[200]. Plants are also susceptible to coral spot fungus[11]. Plants in this genus are notably resistant to honey fungus[200]. The plant has a semi-climbing habit and produces aerial roots[11], and occasionally reaches the size of a small tree[229]. Many of the species in this genus, including this one, are highly toxic and can also cause severe irritation to the skin of some people, whilst other species are not poisonous. It is relatively simple to distinguish which is which, the poisonous species have axillary panicles and smooth fruits whilst non-poisonous species have compound terminal panicles and fruits covered with acid crimson hairs[1, 4]. The toxic species are sometimes separated into their own genus, Toxicodendron, by some botanists[200]. Dioecious. Male and female plants must be grown if seed is required.

5.2.679 Rhus diversiloba

Western Poison Oak, Pacific poison oak

4 tlin 8 cyuc 0 kcak 0 tcan 2 dwat 2.5 m hkuc htut cyutli tcup hwicli hyihrasahjlutnyik hpa7tli flatprikliwis hpa7tmwatli nyanhjen hjonli

drutta Rhus diversiloba is a deciduous Shrub growing to 2.5 m (8ft 2in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista All parts of the plant contain resinous phenolic compounds known as urushiolis. Direct contact with the plant, exposure to smoke or fumes from a burning plant or even contact with pets or animals that have touched the plant can cause severe allergic dermatitis in some individuals. There is usually a latent period of about 12 - 24 hours from the moment of contact, this is followed by a reddening and severe blistering of the skin. Even plant specimens 100 or more years old can cause problems[274].

tcanta Basketry Dye Ink Mordant OilThe leaves are rich in tannin. They can be collected as they fall in the autumn and used as a brown dye or as a mordant[169]. An oil is extracted from the seeds[4]. It attains a tallow-like consistency on standing and is used to make candles. These burn brilliantly, though they emit a pungent smoke[4]. The supple stems are used as the warp in basket making[92]. Slender stems are used as circular withes in basket making[257]. An excellent black dye is obtained by exposing the sap to air[92].

dwatta Antidote Contraceptive Eczema Ophthalmic WartsWestern poison oak was employed medicinally by some native North American Indian tribes who used it to treat various complaints[257]. In view of the potential toxicity of the plant, extreme caution is advised in any use of it. See the notes above on toxicity. A leaf has been swallowed in the spring as a contraceptive[257]. A tincture of the fresh leaves has been used in the treatment of eczema and skin diseases[4]. It is also used in the treatment of warts, ringworm etc[92]. A poultice of the fresh leaves has been applied to rattlesnake bites[257]. The leaf buds have been eaten in the spring in order to obtain immunity from the plant poisons[257] A moxa of the plant has been used in the treatment of warts and ringworm[257]. The juice of the plant has been used as a treatment for warts[257]. An infusion of the dried roots has been taken in order to give immunity against any further poisoning[257]. A decoction of the roots has been used as drops in the eyes to heal tiny sores inside the eyelids and to improve vision[257].

nrakta Western N. America - Vancouver to California. ksacta Thickets and wooded slopes in foothills, along streams, in washes and hedgerows below 1500 metres[71, 92].

propta Seed - best sown in a cold frame as soon as it is ripe. Pre-soak the seed for 24 hours in hot water (starting at a temperature of 80 - 90c and allowing it to cool) prior to sowing in order to leach out any germination inhibitors[200].

The stored seed also needs hot water treatment and can be sown in early spring in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 10cm with a heel, July/August in a frame[200]. Root cuttings 4cm long taken in December and potted up vertically in a greenhouse. Good percentage[78, 200]. Suckers in late autumn to winter[200].

nwatta Succeeds in a well-drained fertile soil in full sun[200]. Plants do not require a rich soil[11]. The young grown in spring can be damaged by late frosts. Plants have brittle branches and these can be broken off in strong winds[200]. Plants are also susceptible to coral spot fungus[11]. This species is closely related to *R. toxicodendron*[1]. Many of the species in this genus, including this one, are highly toxic and can also cause severe irritation to the skin of some people, whilst other species are not poisonous. It is relatively simple to distinguish which is which, the poisonous species have axillary panicles and smooth fruits whilst non-poisonous species have compound terminal panicles and fruits covered with acid crimson hairs[1, 4]. The toxic species are sometimes separated into their own genus, *Toxicodendron*, by some botanists[200]. Plants in this genus are notably resistant to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required.

5.2.680 Apocynum pictum

Kendyr

4 tin 9 cyuc 0 kcaak 3 tcan 2 dwat 2 m hkuc
pcimhmhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flat-
prikrlwshsom hpa7tmwatli hjonli

drutta *Apocynum pictum* is a PERENNIAL growing to 2 m (6ft) by 0.3 m (1ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. The flowers are pollinated by Bees, Lepidoptera (Moths and Butterflies). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in saline soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

tcanta Agroforestry Uses: The fragrant flowers are a good source of honey for bees[266]. Other Uses: The strong bast fibres obtained from the inner bark are used in making cloth, strings, sails, fishing nests, and high-quality paper[266]. The leaves yield up to 5% gum, which is used for making rubber[266]. Carbon Farming: Industrial Crop: fiber. The dogbane-milkweed family *Asclepias*, *Apocynum*, *Calotropis*, and *Trachomitum* spp) has been used for fiber industrial crops for millennia with a number in cultivation as regional crops. All of these crops are dual-purpose fibres, offering bast fibres from the stem and seed fiber or 'floss' in the fruit pods. Many have also been identified as potential hydrocarbon crops due to high latex content. Could be integrated into various agroforestry systems rather than as monocultures [1-1].

dwatta The leaves yield up to 5% gum (?latex), which is used for making a medicine used as a sedative and to treat hypertension[266]. The species has fragrant flowers and is grown as a honey plant[266].

nrakta Central Asia - Tajikistan, Kyrgyzstan, Kazakhstan, western China, Mongolia ksacta Salt-barren areas, desert margins, riversides[266].

propta Seed - best sown as soon as it is ripe in late summer and overwintered outdoors. The seed requires a period of cold stratification if it is to germinate well[238]. Prick out the seedlings when large enough to handle and grow them on in a cold frame for their first winter, planting out in late spring of the following year[K]. Division in spring just before active growth begins[200]. Plants can also be divided in the autumn[238].

nwatta Industrial Crop: Fiber Management: Hay Regional CropSpecies in this genus generally succeed in sun or shade in most well-drained but moisture-retentive soils[1, 200]. The species has fragrant flowers and is grown as a honey plant[266]. *Apocynum* species are used as food plants by the larvae of some Lepidoptera species, including the mouse moth and the Queen butterfly. Climate: cold

to warm temperate. Humidity: arid to semi-arid. Carbon Farming - Cultivation: regional crop. Management: hay.

5.2.681 Cotoneaster divaricatus

Spreading Cotoneaster

4 tin 8 cyuc 0 kcaak 3 tcan 0 dwat 2 m hkuc
hmimhtut cyutli kyuctup hwicli hyishrasjlutnyikrip hpa7tli
flatprikrlwslip hpa7tmwatli xre7t hjonli

drutta *Cotoneaster divaricatus* is a deciduous Shrub growing to 2 m (6ft) by 3 m (9ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies, midges. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. It can tolerate atmospheric pollution.

tcanta Dye Hedge HedgeA rose-tan dye is obtained from the fruit[168]. Plants are often used in informal hedging[200].

nrakta E. Asia - China. Naturalized in southern England. ksacta Rocky slopes, gullies, forests, shrubwoods and thickets at elevations of 1600 - 3400 metres[266].

propta Seed. Members of this genus hybridize freely so, if you require seed that breeds true, it is important to obtain it from a known wild source or from a controlled fertilization of garden plants. The seed is best sown as soon as it is ripe in the autumn in a cold frame, when it will usually germinate in the spring[11, 200]. Stored seed germinates faster if given 3 months warm stratification at 15°C and then 3 months cold stratification at 4°C[164]. The seed usually germinates within 1 - 18 months at 15°C but it can take 2 years[164]. Pot the seedlings up as soon as they are large enough to handle and plant them out into nursery beds or into their permanent positions when they are more than 10cm tall. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200].

nwatta An easily grown plant, it prefers a good soil but also does well in poor soils[1, 11, 200]. It thrives in lime and is also happy in peaty soils[1]. It succeeds in any soil that is not marshy or waterlogged[11, 200]. Succeeds in dry soils[188]. Grows well in heavy clay soils. Succeeds in full sun or semi-shade but does not fruit so freely in a shady position[11, 200]. Tolerates atmospheric pollution[200]. A very hardy species, tolerating temperatures down to at least -15°C[202]. Fairly fast-growing[202]. Hybridizes freely with other members of this genus[200]. The flowers, when inhaled near to, have an unpleasant smell like decaying fish[245]. They are very attractive to bees whilst the fruit is a good winter food source for many species of birds[200]. Trees are notably susceptible to honey fungus[200]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

5.2.682 Macleaya cordata

Plume Poppy

4 tin 10 cyuc 0 kcaak 0 tcan 1 dwat 2 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikrlwis
hpa7tmwatli xre7t hjonli

drutta *Macleaya cordata* is a PERENNIAL growing to 2 m (6ft) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The sap is very poisonous[178].

tcanta Insecticide MusicalThe dried hollow stems can be used as whistles[178]. Kills insects and mosquito lar-

pcista All parts of the plant are highly toxic[7, 10, 19, 65]. Skin contact with the sap can cause dermatitis in some people[65, 200].

tcanta Dye OilA yellow to greenish-brown dye is obtained from the leaves, fruit and bark[13]. The seed contains up to 31% of a fatty oil[74]. No further details are given.

dwatta Antirheumatic Antiseborrhic Cancer Cathartic Diuretic Emetic Homeopathy Rubefacient Stimulant VesicantMezereum has been used in the past for treating rheumatism and indolent ulcers, but because of its toxic nature it is no longer considered to be safe[238]. The plant contains various toxic compounds, including daphnetoxin and mezeirin, and these are currently being investigated (1995) for their anti-leukaemia effects[238, 254]. The bark is cathartic, diuretic, emetic, rubefacient, stimulant and vesicant[4, 7, 9, 21, 46]. The root bark is the most active medically, but the stem bark is also used[4]. It has been used in an ointment to induce discharge in indolent ulcers[4] and also has a beneficial effect upon rheumatic joints[254]. The bark is not usually taken internally and even when used externally this should be done with extreme caution and not applied if the skin is broken[4, 21, 254]. The bark is harvested in the autumn and dried for later use[7]. The fruits have sometimes been used as a purgative[4]. A homeopathic remedy is made from the plant[7]. It is used in the treatment of various skin complaints and inflammations[7, 9].

nrakta Europe, including Britain, from Scandinavia to Spain, east to Macedonia and temperate Asia. ksacta Damp deciduous mixed woodlands and on rich calcareous soils[7, 17, 268].

propta Seed - best sown in a greenhouse as soon as it is ripe with the pot sealed in a polythene bag to hold in the moisture. Remove this bag as soon as germination takes place[164]. The seed usually germinates better if it is harvested 'green' (when it has fully developed but before it dries on the plant) and sown immediately. Germination should normally take place by spring, though it sometimes takes a further year. Stored seed is more problematic. It should be warm stratified for 8 - 12 weeks at 20°C followed by 12 - 14 weeks at 3°C. Germination may still take another 12 months or more at 15°C[164]. Prick out the seedlings into individual pots as soon as they are large enough to handle. Grow the plants on in the greenhouse for their first winter and then plant out in spring after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame. Layering.

nwatta Landscape Uses:Border, Foundation, Specimen. A good sandy loam suits most members of this genus[11]. Prefers a good heavy soil and some shade[31, 49]. Prefers a calcareous soil[13, 17, 19] and cool moist conditions[11, 49]. There is no evidence to suggest it requires a calcareous soil, but all members of this genus do well on acid soils[11]. A very ornamental plant[1], it is hardy to about -30°C[184]. Plants tend to be short-lived in cultivation, probably due to excessive seed bearing[11, 200]. Plants are resentful of root disturbance and should be planted into their permanent positions as soon as possible[188]. They also resent being cut and so should not be pruned unless it is essential[245]. A good bee plant, providing a source of nectar very early in the year[108]. The flowers have a delicious sweet perfume[245]. Special Features:Attractive foliage, Not North American native, Naturalizing, All or parts of this plant are poisonous, Fragrant flowers, Attractive flowers or blooms.

5.2.706 Vinca minor

Lesser Periwinkle, Flower of Death, English Holly, Creeping Myrtle, Creeping Vinca, Common Periwink
4 tin 9 cyuc 0 kcaak 0 tcan 3 dwat m hkuc
pcimhmhtut cyutli hgatyuctup hwicli hrasjlutnyikrip
hpa7tli flatprikrlwis hpa7tmwatli xre7t hjonli

drutta *Vinca minor* is an evergreen Shrub growing to 0.2 m (0ft 8in) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in leaf all year, in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

pcista Large quantities of the plant are poisonous[19, 65].

tcanta BasketryThe stems are used in basket making[74]. A very good ground cover for covering steep banks and shady places, spreading rapidly once established and forming a dense cover within 2 years[11, 28, 31, 190, 200]. It is less dense on dry or exposed sites[197]. Plants are best spaced about 60cm apart each way[208].

dwatta Antispasmodic Astringent Bitter Detergent Homeopathy Hypotensive Sedative Stomachic TonicThe plant is sedative and tonic[21, 53, 165]. It contains the alkaloid 'vincamine', which is used by the pharmaceutical industry as a cerebral stimulant and vasodilator[238]. Since the discovery of vincamine in the leaves, the plant has been used herbally to treat arteriosclerosis and for dementia due to insufficient blood supply to the brain[254]. The leaves are bitter, detergent and stomachic[7]. Taken internally, they are used in the treatment of internal bleeding, heavy menstrual bleeding and nosebleeds[254]. When crushed and applied to wounds they have astringent and healing properties[7]. A mouthwash is used to treat gingivitis, sore throats and mouth ulcers[254]. The leaves are gathered in the spring and dried for later use[7]. The root is antispasmodic and hypotensive[7, 19]. It is used to lower the blood pressure[19]. The root is gathered in the autumn and dried for later use[7]. The fresh flowers are gently purgative, but lose their effect on drying[4]. A homeopathic remedy is made from the fresh leaves[4]. It is used in the treatment of haemorrhages[4].

nrakta Europe, possibly also including Britain, from Denmark south and east to Spain and W. Asia. ksacta Fields, woodland edges, copses and hedgerows[7, 13, 17]. Ash and oak-hornbeam woods on better soils in central Europe[17].

propta Seed - we have no information on this species but suggest sowing the seed in a cold frame as soon as it is ripe if possible. Sow stored seed in late winter in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring just before active growth commences[78], or in autumn[1]. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring. Cuttings of mature wood of the current seasons growth, 5 - 10 cm long, October in a cold frame. Roots quickly. High percentage[78].

nwatta Landscape Uses:Border, Container, Erosion control, Ground cover, Massing, Specimen. A very easily grown plant, it succeeds in almost any soil[200] but prefers those that are on the richer side[17]. It grows well in heavy clay soils. Plants are very shade tolerant but they do not flower so well in deep shade[11, 28, 31]. It grows well under deciduous trees[187], and in such a position it can succeed in dry soils[190]. Established plants are drought tolerant[190]. A very ornamental[1] and polymorphic plant[200], there are some named forms selected for their ornamental value[187]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. This species rarely if ever sets seed in Britain[4]. It spreads rapidly by long trailing and rooting stems once it is established and will swamp out smaller plants[4]. Special Features:Attractive foliage, Not North American native, Naturalizing, Attractive flowers or blooms.

5.2.707 Erysimum cheiranthoides

Wormseed Mustard

4 tin 8 cyuc 0 kcaak 0 tcan 1 dwat 1 m hkuc
htut cyutli kyuctup hwicli hyishrasjlutnyik hpa7tli prikrlwis
hpa7tmwatli xre7t hjonli

drutta *Erysimum cheiranthoides* is a ANNUAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist or wet soil.

dwatta Analgesic Antispasmodic Appetizer Cardiotonic Diaphoretic Diuretic Homeopathy UrinaryButterbur is widely considered to be an effective cough remedy and recent experiments have shown it to have remarkable antispasmodic and pain-relieving properties[244]. It acts specifically on the bile ducts, stomach and duodenum[254]. The plant contains pyrrolizidine alkaloids, in isolation these are toxic to the liver[254]. The root and the leaves are analgesic, antispasmodic, cardiotonic, diaphoretic and diuretic[4, 9]. A decoction is taken as a remedy for various respiratory problems such as asthma, colds, bronchitis and whooping cough and also other complaints such as fevers and urinary complaints[4, 254]. It is also very effective in the treatment of gastrointestinal complaints and biliary dyskinesia[244, 254]. Externally it can be used as a poultice to speed the healing of wounds and skin eruptions[254]. The leaves are harvested in early summer, the root in late summer to autumn. Both can be dried for later use[9]. Because the plant contains potentially toxic alkaloids its internal use cannot be recommended[254]. A homeopathic remedy is made from the roots[4]. It is used in the treatment of severe and obstinate neuralgia[4].

nrakta Europe, including Britain, from Scandinavia south and east to Spain, north and west Asia. ksacta Wet meadows and copses by streams to 1500 metres[17]. The female form is rare or absent from much of Britain[17].

propta Seed - we have no information on this species but suggest sowing the seed in a cold frame as soon as it is ripe or in early spring. Only just cover the seed and do not allow the compost to dry out. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division succeeds at almost any time of the year. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Succeeds in ordinary garden soil[1], but prefers a deep fertile humus-rich soil that is permanently moist but not stagnant, succeeding in shade, semi-shade or full sun[200]. Requires a moist shady position[187]. Plants can be grown in quite coarse grass, which can be cut annually in the autumn[233]. A very invasive plant, too rampant for anything other than the wild garden[187, 200]. Its roots are very difficult to eradicate[200]. It is best to only grow the male form in the garden to prevent unwanted seedlings popping up all over the place[200]. The growth is so dense and vigorous, with large leaves that can be 75cm or more across, that virtually no other plant is able to grow amongst this species[4]. Plants are a useful early nectar source for bees[200]. Dioecious, male and female plants must be grown if seed is required.

5.2.703 Digitalis ferruginea

Rusty Foxglove

4 tlin 9 cyuc 0 kcaak 0 tcan 2 dwat 1.2 m hkuc hmimhtut cyutli hgatkuyctup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Digitalis ferruginea is a BIENNIAL/PERENNIAL growing to 1.2 m (4ft) by 0.3 m (1ft in) at a medium rate. It is in flower in July, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

pcista All parts of the plant are poisonous[7, 65].

dwatta Cardiac Stimulant TonicThe leaves are cardiac, stimulant and tonic[46, 61]. They are often used in the treatment of certain heart complaints.

nrakta S. and S.E. Europe to W. Asia. ksacta Woods, grassy clearings, rocky slopes and scrub to 2700 metres[50, 187].

propta Seed - surface sow early spring in a cold frame. The seed usually germinates in 2 - 4 weeks at 20°C[175]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer.

Another report says that the seed is best sown in the autumn[188].

nwatta Landscape Uses:Border, Container, Massing, Specimen, Woodland garden. An easily grown plant, succeeding in ordinary garden soil, especially if it is rich in organic matter[1]. It also succeeds in dry soils and, once established, is drought tolerant[188, 190]. It prefers semi-shade but succeeds in full sun if the soil is moist[188, 200]. Plants are hardy to about -15°C[187]. This species is a short-lived perennial[187] and is best grown as a biennial[188]. Members of this genus are rarely if ever troubled by browsing deer and rabbits[233]. Special Features: Attractive foliage, Suitable for cut flowers.

5.2.704 Artemisia lactiflora

White Mugwort

4 tlin 8 cyuc 0 kcaak 0 tcan 2 dwat 1.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Artemisia lactiflora is a PERENNIAL growing to 1.5 m (5ft) by 0.5 m (1ft 8in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from August to October, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The plant might be poisonous in large doses[21]. Skin contact can cause dermatitis in some people[222].

dwatta Emmenagogue TonicWhite mugwort is a bitter aromatic tonic herb. The leaves and flowering stems are used internally in traditional Chinese medicine to treat menstrual and liver disorders[238].

nrakta E. Asia - China. ksacta Forest margins, shrublands, canyons, slopes, roadsides, river banks and thickets from low elevations to 3000 metres[266].

propta Seed - surface sow from late winter to early summer in a greenhouse, making sure that the compost does not dry out[200]. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant out in late spring or early summer. Division in spring or autumn. Basal cuttings in late spring. Harvest the young shoots when about 10 - 15cm long, pot up in a lightly shaded position in a greenhouse or cold frame and plant them out when well rooted. Very easy.

nwatta Landscape Uses:Border, Container, Seashore, Woodland garden. Easily grown in a well-drained circum-neutral or slightly acid loamy soil, preferring a sunny position and a moisture-retentive soil[200]. Plants are tolerant of light shade[200]. Plants are longer lived, more hardy and more aromatic when they are grown in a poor dry soil[245]. There are some named varieties selected for their ornamental value[200]. Members of this genus are rarely if ever troubled by browsing deer[233]. Special Features: Suitable for dried flowers.

5.2.705 Daphne mezereum

Mezereum, Paradise plant, February Daphne

4 tlin 7 cyuc 0 kcaak 0 tcan 2 dwat m hkuc hmim cyutli tcup hwicli jlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta Daphne mezereum is a deciduous Shrub growing to 1.5 m (5ft) by 1.5 m (5ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from February to March, and the seeds ripen from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

vae[147]. The flowers are used to kill maggots whilst the whole plant is used to kill larvae and insects[218].

dwatta Carminative Depurative Diuretic StingsThe whole plant is analgesic, antioedemic, carminative, depurative and diuretic[218]. The juice from the stems of the leaves is used to treat insect bites[4]. A decoction of the leaves and stems is used in the treatment of ringworm[218]. The poisonous sap is used to counter poisonous sores[218].

nrakta E. Asia - E. China, Japan. ksacta Grassy places, open meadows and the grassy floors of Cryptomeria plantations[187].

propta Seed - we have no information on this species but suggest sowing the seed as soon as it is ripe in a cold frame in the autumn. Stored seed should be sown in the early spring. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in the dormant season[200]. Basal cuttings in late spring. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer. Cuttings from the axils of larger leaves in early summer[200]. Root cuttings in the winter[188].

nwatta Landscape Uses:Border, Massing, Specimen. Requires a well-drained deep soil[1] preferring a sunny sheltered position but tolerating light shade[200]. Easily grown in sun or partial shade[187]. Hardy to about -15°C[187]. A very ornamental plant, it can be grown as an isolated specimen in a lawn[1]. An excellent plant for sub-tropical bedding[1]. Plants have spreading underground rhizomes[187] and can be invasive[200]. Special Features: Attractive foliage, Invasive, Naturalizing.

5.2.683 Aster lanceolatus

White Panicle Aster

4 tlin 8 cyuc 0 kcaak 2 tcan 1 dwat 2 m hkuc hmimhtut cyutli tcup hwicli hyshrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta Aster lanceolatus is a PERENNIAL growing to 2 m (6ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles, Lepidoptera (Moths and Butterflies). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

tcanta Attracts wildlife

dwatta Febrifuge VulneraryAn infusion of the plant, combined with another unnamed plant, has been used in the treatment of fevers[257]. A decoction of the plant has been used to dress wounds[257]. The dried and powdered plant has been used as a salve on abrasions[257]. Smoke from the crushed blossoms has been inhaled in the treatment of nose-bleeds[257].

nrakta N. America. Naturalized in eastern and southern Britain[17]. ksacta Low areas in Texas[274].

propta Seed - surface sow in spring in a cold frame. Do not allow the compost to become dry. Pre-chilling the seed for two weeks can improve germination rates[134]. Germination usually takes place within 2 weeks at 20°C[134]. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn[200]. Very easy, larger divisions can be planted straight into their permanent positions whilst smaller clumps are best potted up and kept in a cold frame until they are growing away well. Basal cuttings in late spring. Harvest the shoots when they are about 10 - 15cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Succeeds in most good garden soils[1], preferring one that is well-drained and moisture retentive[200]. Prefers a sunny position[200], but it also succeeds in partial shade[233]. Prefers a rich soil[1], but tolerates poor

ones[233]. There are some named varieties, selected for their ornamental value[257]. Plants need to be divided every few years, preferably in the spring, in order to keep the plant vigorous[187]. Most species in this genus seem to be immune to the predations of rabbits[233]. The flowers attract butterflies and moths, it is also a good bee plant providing nectar in autumn[30].

5.2.684 Rudbeckia hirta

Black Eyed Susan, Coneflower, Gloriosa Daisy, Marguerite Jaune

4 tlin 9 cyuc 0 kcaak 0 tcan 1 dwat 2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Rudbeckia hirta is a BIENNIAL/PERENNIAL growing to 2 m (6ft) by 0.5 m (1ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from July to October, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, hoverflies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

pcista This plant is reputed to be poisonous to cattle, sheep and pigs[155].

tcanta A yellow dye is obtained from the flowers[257].

dwatta An infusion of the roots has been used in the treatment of colds, dropsy and worms in children[257]. A warm infusion of the root has been used as a wash on sores and snake bites[257]. The ooze from the roots has been used as drops to treat earaches[257].

nrakta N. America. An occasional garden escape in Britain[17]. ksacta Disturbed soils in Texas[274].

propta Seed - sow April in a greenhouse. Only just cover the seed. Germination should take place within 2 weeks, prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer[K]. The seed can also be sown in situ[111].

nwatta Landscape Uses:Border, Container, Foundation, Specimen. Succeeds in an ordinary medium soil in sun or shade[111]. Requires a moist soil[1]. Prefers a well-drained soil[188]. Dormant plants are hardy to about -25°C[187]. This species is a biennial or short-lived perennial[200]. Some named forms have been selected for their ornamental value[200]. Members of this genus are rarely if ever troubled by browsing deer[233]. Special Features: North American native, Naturalizing, All or parts of this plant are poisonous, Attracts butterflies, Suitable for cut flowers.

5.2.685 Veratrum californicum

California False Hellebore

4 tlin 8 cyuc 0 kcaak 0 tcan 2 dwat 2.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Veratrum californicum is a PERENNIAL growing to 2.5 m (8ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All parts of the plant are highly poisonous[155, 200]. The flowers are poisonous to insects, including bees[155].

tcanta Disinfectant InsecticideThe dried and powdered root is used as an insecticide and a parasiticide[172]. It is also effective against caterpillars and mammals so great caution is advised[1, 19, 20].

dwatta Analgesic Contraceptive Disinfectant Febrifuge Poultice SalveAlthough a very poisonous plant, California false hellebore was often employed medicinally by a number of native North American Indian tribes who used it mainly as an external application to treat wounds etc[257]. It also had quite a reputation as a contraceptive[257]. It is little, if at

all, used in modern herbalism. Any use of this plant, especially internal use, should be carried out with great care and preferably only under the supervision of a qualified practitioner. The root is analgesic, disinfectant and febrifuge[257]. A decoction has been used in the treatment of venereal disease[257]. The roots have been grated then chewed and the juice swallowed as a treatment for colds[257]. A poultice of the mashed raw root has been used as a treatment for rheumatism, boils, sores, cuts, swellings and burns[257]. The dried and ground up root has been used as a dressing on bruises and sores[257]. A poultice of the chewed root has been applied to rattlesnake bites to draw out the poison[257]. The powdered root has been rubbed on the face to allay the pain of toothache[257]. A decoction of the root has been taken orally by both men and women as a contraceptive[61, 257]. A dose of one teaspoon of this decoction three times a day for three weeks is said to ensure permanent sterility in women[207, 254].

nrakta South-western N. America - Washington to California, west to Nevada, New Mexico, Wyoming. ksacta Swamps, creek bottoms, moist woodlands and meadows, from lowland to the sub-alpine zone[60].

propta Unless stored in damp sand at around 4°C the seed has a short viability[200]. Where possible it is best to sow the seed in a lightly shaded position in the greenhouse as soon as it is ripe[200]. Stored seed needs to be stratified but can be very slow to germinate. Germination can be erratic even for seed sown when it was fresh, it usually takes place within 3 - 12 months at 15°C but can be much longer[200]. The plant produces just one seedleaf in its first year, this forms an over-wintering bulb. It takes up to 10 years for the plant to reach maturity[200]. Sow the seed thinly so there is no need to thin or transplant them, and grow the seedlings on undisturbed in the pot for their first two years of growth. Apply a liquid feed at intervals through the growing season to ensure the plants do not become nutrient deficient. At the end of the second year plant out the dormant plants into individual pots and grow them on in light shade in the greenhouse for a further year or two before planting them out into their permanent positions in late spring or early summer. Division in March/April or in October. Establish the plants in pots in a shaded frame before planting them out[200]. Division is best carried out in the autumn because the plants come into growth very early in the spring[233]. Root cuttings, 6mm long with a bud, rooted in a sandy soil in a cold frame[200].

nwatta Requires a deep fertile moisture retentive humus-rich soil[200]. Succeeds in full sun if the soil does not dry out but prefers a position in semi-shade[200]. Dislikes dry soils[42]. Grows best in a cool woodland garden or a north facing border[42]. Members of this genus are rarely if ever troubled by browsing deer[233]. Plants are long-lived and can be left in the same position for years without attention[233].

5.2.686 *Spiraea douglasii*

Steeplebush, Rose spirea, Menzies' spirea
4 tin 8 cyuc 0 kcaak 0 tcan 1 dwat 2.5 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikkwis hpa7tmwatli xre7t hjonli

drutta *Spiraea douglasii* is a deciduous Shrub growing to 2.5 m (8ft 2in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

tcanta The branches have been used to make brooms[257].

dwatta An infusion of the seeds has been used in the treatment of diarrhoea[257].

nrakta Western N. America. Rarely naturalized in Britain[17]. ksacta Almost always found in wet soils in red-wood and red fir forests from sea level to elevations of 2100 metres[276].

propta Seed - we have no information for this species but suggest sowing the seed as soon as it is ripe in a cold frame if possible. It is likely to require stratification before

it germinates, so stored seed should be sown in a cold frame as early in the year as you receive it. Prick out the seedlings into individual pots when they are large enough to handle, and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a light sandy soil a frame. Cuttings of mature wood of the current seasons growth, 15cm long, October/November in an outdoor frame[200]. Another report says that September is a good time to do this[11]. Division of suckers in early spring[200]. They can be planted out straight into their permanent positions.

nwatta Tolerates most soils[200], but prefers a good loamy soil, abundant moisture and full sunlight[11, 200]. Prefers a moist lime-free soil[182], plants quickly become chlorotic on chalk soils[200]. A very cold hardy plant, tolerating temperatures down to about -25°C[200]. Hybridizes freely with other members of this genus[11]. A rampant suckering shrub, it quickly produces dense thickets and can be used for large-scale naturalistic plantings[200]. It is apt to get thin and poor unless divided up fairly regularly and replanted in fairly good soil[1].

5.2.687 *Osmunda regalis*

Royal Fern, Flowering Fern
4 tin 9 cyuc 0 kcaak 0 tcan 2 dwat 2 m hkuc
hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli frusflatprikkwis hpa7tmwatli hjonli

drutta *Osmunda regalis* is a FERN growing to 2 m (6ft) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 2. The seeds ripen from June to August. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

pcista Although we have found no reports of toxicity for this species, a number of ferns contain carcinogens so some caution is advisable[200]. Many ferns also contain thiaminase, an enzyme that robs the body of its vitamin B complex. In small quantities this enzyme will do no harm to people eating an adequate diet that is rich in vitamin B, though large quantities can cause severe health problems. The enzyme is destroyed by heat or thorough drying, so cooking the plant will remove the thiaminase[172].

tcanta Compost FibreThe hairs of the plant are mixed with wool and are used in making cloth[46, 61]. The roots are the source of 'Osmunda fibre', this was once widely used for potting orchids and other epiphytes[200]. Plants can be grown as a ground cover when spaced about 1 metre apart each way[208].

dwatta Astringent Diuretic Tonic VulneraryThe root is astringent, diuretic, tonic and vulnerary[4, 7, 21]. It is useful in the treatment of jaundice and removing obstructions of the viscera[4]. The fronds are used to make compresses for external application to wounds and rheumatic joints - for which purposes they are fairly effective[7]. An infusion of the fronds, combined with wild ginger roots (*Asarum* species) has been used in the treatment of children with convulsions caused by intestinal worms[257].

nrakta Europe, including Britain, from Norway south and east to N. Africa, Asia, N. and S. America. ksacta Swampy areas, fens and damp woodland[187].

propta Spores - they very quickly lose their viability (within 3 days) and are best sown as soon as they are ripe on the surface of a humus-rich sterilized soil in a lightly shaded place in a greenhouse. Keep the compost moist, preferably by putting a plastic bag over the pot. Plants develop very rapidly, pot on small clumps of plantlets as soon as they are large enough to handle and keep humid until they are well established. Do not plant outside until the ferns are at least 2 years old. Cultivars usually come true to type[200]. Division of the rootstock in the dormant season. This is a very strenuous exercise due to the mass of wiry roots[200].

nwatta Landscape Uses:Border, Container, Ground cover, Rock garden, Specimen, Woodland garden. An easily grown plant[4, 187], it prefers a soil of swamp mud and loamy or fibrous peat, sand and loam[1, 4]. Succeeds in most moist soils, preferring acid conditions[200]. Requires a constant supply of water, doing well by ponds, streams etc[1]. Plants

The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All parts of the plant are highly poisonous[7, 10, 19, 65].

tcanta InsecticideThe dried and powdered root contains pyrethrins and is used as an insecticide and a parasiticide[1, 7, 19, 20]. It is also effective against caterpillars and mammals so great caution is advised[1, 19, 20].

dwatta Analgesic Anthelmintic Antiemetic Cathartic Emetic Errhine Expectorant Hypnotic SternutatoryThe root is analgesic, anthelmintic, cathartic, emetic, errhine, expectorant, hypnotic and sternutatory[4, 7, 9, 178, 192]. The root is very poisonous, with a paralyzing effect on the nervous system, and is scarcely if ever used internally[4, 7], though the alkaloids it contains are used in the pharmaceutical industry[9]. It is occasionally used externally as a local analgesic, though even this is not without its dangers since it can be absorbed through broken skin[4, 7]. It is also used in veterinary medicine[244]. The root is harvested in early autumn and is dried for later use[7].

nrakta Europe. E. Asia - Siberia. N. Africa. ksacta Moist grassy sub-alpine meadows and open woods[187].

propta Unless stored in damp sand at around 4°C the seed has a short viability[200]. Where possible it is best to sow the seed in a lightly shaded position in the greenhouse as soon as it is ripe[200]. Stored seed needs to be stratified but can be very slow to germinate. Germination can be erratic even for seed sown when it was fresh, it usually takes place within 3 - 12 months at 15°C but can be much longer[200]. The plant produces just one seedleaf in its first year, this forms an over-wintering bulb. It takes up to 10 years for the plant to reach maturity[200]. Sow the seed thinly so there is no need to thin or transplant them, and grow the seedlings on undisturbed in the pot for their first two years of growth. Apply a liquid feed at intervals through the growing season to ensure the plants do not become nutrient deficient. At the end of the second year plant out the dormant plants into individual pots and grow them on in light shade in the greenhouse for a further year or two before planting them out into their permanent positions in late spring or early summer. Division in March/April or in October. Establish the plants in pots in a shaded frame before planting them out[200]. Division is best carried out in the autumn because the plants come into growth very early in the spring[233]. Root cuttings, 6mm long with a bud, rooted in a sandy soil in a cold frame[200].

nwatta Requires a deep fertile moisture retentive humus-rich soil[200]. Succeeds in full sun if the soil does not dry out but prefers a position in semi-shade[200]. Dislikes dry soils[42]. Grows best in a cool woodland garden or a north facing border[42]. Members of this genus are rarely if ever troubled by browsing deer[233]. Plants are long-lived and can be left in the same position for years without attention[233].

5.2.700 *Melanthium virginicum*

Bunchflower
4 tin 8 cyuc 0 kcaak 0 tcan 1 dwat 1.7 m hkuc
hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli frusflatprikkwis hpa7tmwatli xre7t hjonli

drutta *Melanthium virginicum* is a PERENNIAL growing to 1.7 m (5ft 7in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

pcista All parts of the plant are highly toxic[207].

dwatta AnthelminticThe root has been used to kill internal parasites[207].

nrakta Eastern N. America - New York to Florida, Texas and Indiana. ksacta Lowland prairies and moist open woods[228]. Bogs, marshes, wet woods, savannas, meadows, along railroads at elevations of 10 - 800 metres[270].

propta Unless the seed is stored in damp sand at around 4°C it has a short viability[200]. Where possible it is best to sow the seed in a lightly shaded position in a cold frame as soon as it is ripe[200]. Stored seed needs to be cold stratified but can be very slow to germinate. Germination can be erratic even for seed sown when it was fresh, it usually takes place within 3 - 12 months at 15°C but can be much longer[200]. Sow the seed thinly so that it can be grown on in the pot without disturbance for the first couple of years. Give an occasional liquid feed in the growing season to ensure the plants do not become nutrient deficient. The plant produces just one seed leaf in its first year, this forms an over-wintering bulb. At the end of the second year's growth, pot up the over-wintering bulbs, placing one or two bulbs in each pot. Grow them on in a lightly shaded position in a cold frame for at least another couple of years before planting them out into their permanent positions. It takes up to 10 years for the plant to reach maturity[200]. Division in March/April or in October. Establish the plants in pots in a shaded frame before planting them out[200]. Root cuttings, 6mm long with a bud, rooted in a sandy soil in a cold frame[200].

nwatta Requires a deep fertile moisture retentive humus-rich soil[200]. Succeeds in full sun if the soil does not dry out but prefers a position in semi-shade[200]. Dislikes dry soils[42]. Grows best in a cool woodland garden or a north facing border[42]. Succeeds in acid soils in a bog garden[200].

5.2.701 *Stachys germanica*

Downy Woundwort, German hedgenettle
4 tin 8 cyuc 0 kcaak 0 tcan 2 dwat 1 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikkwis hpa7tmwatli xre7t hjonli

drutta *Stachys germanica* is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

dwatta Antiseptic PlasterThe leaves are densely covered with long white silky hairs, they have been used as a substitute for lint in dressing wounds[4]. The thick, lint-like leaves are both soft and strongly antiseptic[245].

nrakta Central and Southern Europe, including Britain, to N. Africa and the Orient. ksacta Pastures and hedgebanks[17], especially on limestone soils[4]. A very rare native of Britain, it is only found in Oxford, though is common in Europe[4, 17].

propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring.

nwatta Easily grown in any deep, well-drained and moderately fertile soil, preferring a position in full sun[200]. The plant is a short-lived perennial and is sometimes biennial[17]. Closely related to *S. cretica* and *S. byzantina*[200].

5.2.702 *Petasites hybridus*

Butterbur, Pestilence wort
4 tin 8 cyuc 0 kcaak 0 tcan 3 dwat 1 m hkuc
pcimhmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatprikkwis hpa7tmwatli nyanhjen hjonli

drutta *Petasites hybridus* is a PERENNIAL growing to 1 m (3ft 3in) by 3 m (9ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in leaf from April to December, in flower from March to May. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils.

clay loams. A drought-resistant plant, it will withstand high temperatures. Prefers areas with 480-750 mm annual rain-fall, but will produce on rather poor dry soils[269]. Plants are hardy in all parts of Britain, though they are less winter-hardy than *Phleum pratense* or *Bromus inermis* and do not extend as far north in Europe[269]. A very variable plant[1]. There are both diploid and triploid forms[274]. Numerous strains have been developed, some coarse and stemmy, others good for hay and early grazing. Local ecotypes in the Mediterranean region are adapted to long hot dry summers. In Europe two types have been developed, one for pasture and one for hay. Pasture types produce more basal leaves and generally are more spreading than the hay types. Selections made in Canada, Sweden and Finland are improved for winter hardiness. Improved strains are more leafy, persistent and later flowering than unimproved commercial types[269]. An important food plant for the caterpillars of several lepidoptera species[30]. The plant is occasionally grown for lawns and is particularly well adapted for growing under shade[269]. However, this species does not make a good lawn grass because it is too coarse[1].

5.2.696 Silphium trifoliatum

Whorled rosinweed

4 tlin 6 cyuc 0 kcaak 2 tcan 0 dwat 1.8 m hkuc

hmimhtut cyutli kyucstup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli hjonli

drutta *Silphium trifoliatum* is a PERENNIAL growing to 1.8 m (6ft) by 1.8 m (6ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. The flowers are pollinated by Bees, Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kaakta Dave Jacke in his book *Edible Forest Gardens* has noted that this plant is edible although we have been unable to find any confirmation. Other *Silphium* species are edible for example *Silphium integrifolium* produces an protein-oil staple Crop and *Silphium laciniatum* resin is used as a chewing gum to sweeten the breath[4, 61, 105, 257].

tcanta Invertebrates shelter: beneficial for insects and other arthropods. Nectary: provides nectar or pollen for beneficial insects [1-2]. Garden Ornamental. More manageable than most perennial sunflowers as it spreads slowly, and it is not known to be allelopathic. Adapts well to prairies, wild-flower/native plant gardens, naturalized areas, meadows or moist, open woodland areas. Attracts birds and butterflies

nrakta Native to the eastern United States east of the Mississippi River. ksacta Open, grassy areas such as prairies, river cobble bars, and roadsides.

propta Seed. Plants may be slow to establish in the garden, particularly when grown from seed. Plants often self-seed in optimum growing conditions. Division.

nwatta A tall perennial forb for full to partial shade. Leaves are attached to the stem in a 'whorled' formation. Sun Exposure: Full, Partial. Soil Moisture: Medium, Medium-Dry. Drought-tolerant; suitable for xeriscaping. Bloom Time: July to September. Bloom Color: Yellow. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2].

5.2.697 Aconitum hemsleyanum

4 tlin 8 cyuc 0 kcaak 0 tcan 1 dwat 1.5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrp hpa7tli flatprikliwis hpa7tmwatli hjonli

drutta *Aconitum hemsleyanum* is a PERENNIAL growing to 1.5 m (5ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from July to August. The flowers are pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The whole plant is highly toxic - simple skin contact has caused numbness in some people[1].

dwatta A widely used herbal remedy in China, where it is cultivated for its root[4]. This is harvested in the autumn as the plant dies down and is then dried before being used. The root is anaesthetic, analgesic, anti-inflammatory, anti-rheumatic, cardiotonic, stimulant and vasodilator[4]. Use with caution, the plant is very poisonous and should not be used internally[218].

nrakta E. Asia - C. and W. China. ksacta Forests, forest margins, scrub, mountains and grassy slopes at elevations of 1700 - 3500 metres[266].

propta Seed - best sown as soon as it is ripe in a cold frame[111]. The seed can be stratified and sown in spring but will then be slow to germinate[133]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer. Division - best done in spring but it can also be done in autumn[1, 111]. Another report says that division is best carried out in the autumn or late winter because the plants come into growth very early in the year[233].

nwatta Thrives in most soils and in the light shade of trees[1]. Grows well in heavy clay soils. Prefers a moist soil in sun or semi-shade[200]. Prefers a calcareous soil. Grows well in open woodlands[1, 4]. Members of this genus seem to be immune to the predations of rabbits and deer[233]. A greedy plant, inhibiting the growth of nearby species, especially legumes[54]. Closely related to *A. fischeri* and considered to be part of that species by some botanists[1].

5.2.698 Lobelia spicata

Pale Spike, Palespike lobelia

4 tlin 8 cyuc 0 kcaak 0 tcan 1 dwat 1 m hkuc

hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Lobelia spicata* is a PERENNIAL growing to 1 m (3ft 3in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from June to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

pcista The plant is potentially poisonous[222]. It contains the alkaloid lobeline which has a similar effect upon the nervous system as nicotine[274].

dwatta Emetic MiscellanyA tea made from the leaves is emetic[222]. A wash made from the stalks was used to treat neck and jaw sores[222]. A tea made from the root was used in the treatment of trembling limbs - it was applied to scratches made in the limb[222].

nrakta Eastern N. America - New Brunswick to Minnesota. ksacta Dry mostly sandy soils[235] in fields, meadows, glades and thickets[222].

propta Seed - best sown as soon as it is ripe in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring[200]. Basal cuttings in spring[1]. Harvest the shoots when they are about 10cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer. Layering in moist sand, it forms roots at the nodes[200].

nwatta Requires a moist soil, succeeding in full sun or partial shade[111, 187, 200].

5.2.699 Veratrum album

White Hellebore, White false hellebore

4 tlin 8 cyuc 0 kcaak 0 tcan 2 dwat 1.5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Veratrum album* is a PERENNIAL growing to 1.5 m (5ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August.

thrive in full sun so long as there is no shortage of moisture in the soil and also in shady situations beneath shrubs etc[200]. Plants are hardy to at least -20°C, they are ever-green in warm winter areas but deciduous elsewhere[200]. Members of this genus are rarely if ever troubled by browsing deer[233]. Transplants well, even when quite large[4]. Some named forms have been selected for their ornamental value[187]. Special Features:Attractive foliage, North American native, Naturalizing, Wetlands plant, There are no flowers or blooms.

5.2.688 Solanum dulcamara

Bittersweet. Bittersweet Nightshade, Climbing nightshade, Bittersweet, Deadly Nightshade, Poisonous

4 tlin 8 cyuc 0 kcaak 0 tcan 3 dwat 2.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Solanum dulcamara* is a PERENNIAL CLIMBER growing to 2.5 m (8ft) by 2.5 m (8ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from June to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

pcista All parts of the plant, including the fruit, are poisonous[4, 7, 10, 13, 19], though only mildly so[21, 65]. Adverse effects include: nausea, vomiting, diarrhoea and dilated pupils. The stem contains only low concentrations of alkaloids and therefore toxicity. Overdose may cause paralysis of the central nervous system, slow heart and respiration, low temperature, vertigo, delirium, convulsions and death [301].

dwatta Alterative Anodyne Cancer Depurative Diuretic Eczema Emetic Expectorant Hepatic Homeopathy Narcotic PurgativeBittersweet is a poisonous plant that has a long history of use in the treatment of skin diseases, warts, tumours, felons etc[238]. It should be used with caution and only under the supervision of a qualified practitioner, this is a poisonous plant that, in excess, paralyzes the central nervous system, slows the heart and respiration, and lowers temperature, causing vertigo, delirium, convulsions and death[21, 238]. See also the notes above on toxicity. All parts of the plant are alterative, anodyne, depurative, mildly diuretic, emetic, expectorant, hepatic, mildly narcotic and purgative[4, 7, 9, 13, 21, 165]. The dried stem, usually collected in the autumn and preferably from the ends of branches 2 - 3 years old, is the part that is most valued medicinally, though the leaves are also used[4]. The plant is chiefly used as an alterative when taken internally in the treatment of a range of skin diseases, it is also used in the treatment of arthritis, rheumatism, bronchial congestion, heart ailments, ulcerative colitis and jaundice[4, 218, 238]. Externally, the plant is used to treat skin eruptions, ulcers, rheumatism and cellulite[238]. Two to three year old stems are harvested in the spring, or after the leaves have fallen in the autumn, and dried for later use[238]. The fruits are marinated in vinegar and applied to cancerous sores and other swellings[218]. A decoction of the root is used in the treatment of cancer and swellings[218]. The root is harvested in the autumn and dried for later use[238]. A homeopathic remedy is made from the fresh, green, still plant stems and leaves, harvested as the plant begins to flower[232]. This is used in treating a variety of complaints including backaches, cough, diarrhoea, eye inflammations and joint pains[232]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve *Solanum dulcamara* for eczema, furuncles (boils), acne, warts (see [302] for critics of commission E).

nrakta Europe, including Britain, south and east from Norway to N. Africa and temperate Asia. ksacta Hedgerows and woody areas, avoiding acid soils[17]. Also found on moist banks by the edges of swamps[232].

propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in the summer. If you have sufficient seed then it can be sown outdoors in situ in the spring. Division in spring.

nwatta An easily grown plant, it succeeds in most soils[1, 202]. Prefers a damp shady position and a neutral to alkaline soil[10, 238]. Succeeds in full sun to light shade[202]. If being grown for its medicinal uses, the plant is best placed in a dry and exposed position[4]. Hardy to at least -15°C[202]. Special Features:Attractive foliage, Not North American native, Invasive, Naturalizing, All or parts of this plant are poisonous.

5.2.689 Populus maximowiczii

Doronoki, Japanese poplar

4 tlin 8 cyuc 0 kcaak 2 tcan 1 dwat m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli nyanhjen hjonli

drutta *Populus maximowiczii* is a deciduous Tree growing to 30 m (98ft) by 8 m (26ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from May to June, and the seeds ripen from July to August. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

tcanta Rooting hormone WoodAn extract of the shoots can be used as a rooting hormone for all types of cuttings. It is extracted by soaking the chopped up shoots in cold water for a day[172]. Wood - soft, rather woolly in texture, without smell or taste, of low flammability, not durable, very resistant to abrasion. Used for wood pulp, boxes, timber for construction, ship building, and matchwood[11, 46, 61, 266].

dwatta Anodyne Antiinflammatory FebrifugeAlthough no specific mention has been seen for this species, the bark of most, if not all members of the genus contain salicin, a glycoside that probably decomposes into salicylic acid (aspirin) in the body[213, 238]. The bark is therefore anodyne, anti-inflammatory and febrifuge. It is used especially in treating rheumatism and fevers, and also to relieve the pain of menstrual cramps[238].

nrakta E. Asia - China, Japan, Korea. ksacta Sunny fluvial plains and river banks. C. and N. Japan[58]. Woods at elevations of 500 - 2000 metres in China[266].

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

nwatta An easily grown plant, it does well in a heavy cold damp soil[1]. Prefers a deep rich well-drained circum-neutral soil, growing best in the south and east of Britain[11, 200]. Growth is much less on wet soils, on poor acid soils and on thin dry soils[11]. It does not do well in exposed upland sites[11]. It dislikes shade and is intolerant of root or branch competition[200]. Trees are susceptible to bacterial canker[11]. Poplars have very extensive and aggressive root systems that can invade and damage drainage systems. Especially when grown on clay soils, they should not be planted within 12 metres of buildings since the root system can damage the building's foundations by drying out the soil[11]. Dioecious. Male and female plants must be grown if seed is required. Hybridizes freely with other members of this genus[200].

5.2.690 *Verbascum densiflorum*

Mullein

4 tin 8 cyuc 0 kcaak 2 tcan 2 dwat 1.2 m hkuc
htut cyutli kyuctup hwicli hrasljutnyik hpa7tli flatprikli-wisslip hpa7tmwatli fyifxre7t hjonli

drutta *Verbascum densiflorum* is a BIENNIAL growing to 1.2 m (4ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil.

tcanta Dynamic accumulator.

dwatta Anodyne Antirheumatic Antiseptic Astringent Demulcent Diuretic Emollient Expectorant Pectoral VulneraryThe flowers and leaves are anodyne, antiseptic, astringent, demulcent, emollient, expectorant and vulnerary[4, 9, 13, 21, 46, 53, 165, 238]. An infusion is used internally in the treatment of various respiratory complaints including coughs, bronchitis, asthma and throat irritations[9, 238]. An infusion of the fresh or dried flowers in olive oil is used to treat earaches, sores, wounds, boils etc[238]. The plant is harvested when in flower and should be dried quickly and with care or it will lose its medicinal qualities[9, 238].

nrakta C. Europe. Occasionally naturalized in Britain[17]. ksacta Waste places, railway embankments and similar dry sunny localities[9].

propta Seed - sow late spring to early summer in a cold frame and only just cover the seed[200]. Germination usually takes place within 2 - 3 weeks. When they are large enough to handle, prick out the seedlings into individual pots and plant them out in late summer. The seed has a long viability[200].

nwatta Succeeds in most well-drained soils, including dry ones, preferring a sunny position[200]. Dislikes shade and wet soils[200]. Thrives on chalk[200]. Prefers a light soil[200]. Plants are hardy to about -20°c[187]. This species is closely related to *V. phlomooides*[200]. Hybridizes with other members of this genus, though the progeny are usually sterile[200].

5.2.691 *Aconitum japonicum*

4 tin 8 cyuc 0 kcaak 0 tcan 2 dwat 1 m hkuc
hmimhtut cyutli tcup hwicli hrasljutnyikfrip hpa7tli flatprikli-wisslip hpa7tmwatli hjonli

drutta *Aconitum japonicum* is a PERENNIAL growing to 1 m (3ft 3in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from August to October. The flowers are pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The whole plant is highly toxic - simple skin contact has caused numbness in some people[1, 174].

dwatta Analgesic AntirheumaticThis is a widely used herbal remedy in China, where it is cultivated for its root[218]. The root is analgesic, antirheumatic, cardiotonic and stimulant[174, 218]. Used in the treatment of neuralgia[174]. Use with caution, and only under the supervision of a qualified practitioner. The plant is very poisonous and should not be used internally[218].

nrakta E. Asia - China, Japan. ksacta Forests, forest margins, by streams at elevations of 500 - 1500 metres in Liaoning province[266].

propta Seed - best sown as soon as it is ripe in a cold frame[111]. The seed can be stratified and sown in spring but will then be slow to germinate[133]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer. Division - best done in spring but it can also be done in autumn[1, 111]. Another report says that division is best carried out in the autumn or late winter because the plants come into growth very early in the year[233].

nwatta Thrives in moist soils and in the light shade of trees[1]. Grows well in heavy clay soils. Prefers a moist soil

in sun or semi-shade[200]. Prefers a calcareous soil. A very ornamental plant[233], it grows well in open woodlands[1, 4]. Members of this genus seem to be immune to the predations of rabbits and deer[233]. A greedy plant, inhibiting the growth of nearby species, especially legumes[54]. Closely related to *A. chinensis*[1].

5.2.692 *Phleum pratense*

Timothy

4 tin 8 cyuc 0 kcaak 0 tcan 1 m hkuc
hmimhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikli-wisslip hpa7tmwatli xre7t hjonli

drutta *Phleum pratense* is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Two allergens producing strong skin reactions and a haemagglutinating action have been isolated from timothy pollen. The pollen contains several flavonol-glycosides, among them dactylin (isorhammetin-31,4-diglycoside)[269].

tcanta Biomass Fodder HairThe stems have been used to make hair brushes[257]. The plant can yield up to 15 tonnes of plant material per hectare and is a potential source of biomass[269].

dwatta CancerStored sterile timothy extracts arrested the growth of Sarcoma 45 and other tumour types[269].

nrakta Britain. ksacta Common in meadows throughout Britain, though rare in the north[17].

propta Seed - sow spring in situ, only just covering the seed. If seed is in short supply, it can be surface sown in a pot in a cold frame. Ensure the pot does not dry out. When large enough to handle, prick the seedlings out into individual pots and plant out in the summer. Division in spring.

nwatta Fodder: Pasture Management: Hay Manageme Standard Staple Crop: Balanced carbAn easily grown plant, it succeeds in a sunny position in any ordinary soil[200]. The plant is not drought tolerant[269]. Timothy grass is reported to tolerate an annual precipitation in the range of 35 to 176cm, an annual temperature range of 4.4 to 18.6°C, and a pH of 4.5 to 7.8[269]. The plant is best adapted to a cool, humid, temperate climate, growing best on rather heavy, deep and moist or even wet soils[269]. Yields are lower on light dry soils and sands[269]. The optimum temperature for growth is 18.3° - 21.6°C varying with day/night temperatures of 15°/10°C and 21°/15°C[269]. Timothy grass is a very variable species that is commonly grown as a hay grass. Several named forms have been developed[17, 269]. A short-lived perennial it is a common cause of hayfever[257]. An attractive addition to the wild flower meadow, the inflorescence dries and dyes well so is used in dried flower displays[200].

5.2.693 *Verbascum nigrum*

Dark Mullein, Black mullein

4 tin 8 cyuc 0 kcaak 2 tcan 3 dwat 1 m hkuc
htut cyutli kyuctup hwicli hrasljutnyik hpa7tli flatprikli-wisslip hpa7tmwatli fyifxre7t hjonli

drutta *Verbascum nigrum* is a BIENNIAL/PERENNIAL growing to 1 m (3ft 3in) by 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to October, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil.

tcanta Dynamic accumulator.

dwatta Anodyne Antiseptic Demulcent Diuretic Expectorant PectoralThe flowers and leaves are anodyne, antiseptic, astringent, demulcent, emollient, expectorant, pectoral and vulnerary[21, 238]. An infusion is used internally in the treatment of various respiratory complaints including

coughs, bronchitis, asthma and throat irritations[238]. An infusion of the fresh or dried flowers in olive oil is used to treat earaches, sores, wounds, boils etc[238]. The plant is harvested when in flower and should be dried quickly and with care or it will lose its medicinal qualities[238].

nrakta Europe, including Britain, from Scandinavia south and east to Spain, Siberia, Macedonia, Caucasus. ksacta Waysides and open habitats on banks etc, usually on dry calcareous soils[17, 200].

propta Seed - sow late spring to early summer in a cold frame and only just cover the seed[200]. Germination usually takes place within 2 - 3 weeks. When they are large enough to handle, prick out the seedlings into individual pots and plant them out in late summer. The seed has a long viability[200]. Division in spring. This plant is a short-lived perennial that grows away very well from seed, so we do not try and divide it.

nwatta An easily grown plant, it succeeds in most well-drained soils, including dry ones, preferring a sunny position[111, 200]. Dislikes shade and wet soils[124, 200]. Plants only really thrive when they are grown on chalky soils[200]. Prefers a light soil[200]. This species is fairly reliably perennial[200], but only when grown on light or medium soils[111]. A very ornamental plant, it often self-sows[1, 111]. Hybridizes with other members of this genus, though the progeny are usually sterile[200]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fleshy. Thick or swollen - fibrous or tap root [2-1].

5.2.694 *Aster novae*

New England Aster

4 tin 9 cyuc 0 kcaak 0 tcan 2 dwat 1.5 m hkuc
hmimhtut cyutli tcup hwicli hyishrasljutnyik hpa7tli flatprikli-wisslip hpa7tmwatli fyifxre7t hjonli

drutta *Aster novae-angliae* is a PERENNIAL growing to 1.5 m (5ft) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 2. It is in flower from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles, Lepidoptera (Moths and Butterflies). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

dwatta The root is analgesic, astringent, expectorant and febrifuge[257]. A poultice has been used in the treatment of pain, fevers and diarrhoea[257]. The ooze of the roots has been sniffed in the treatment of catarrh[257]. A decoction of the whole plant has been used in the treatment of all kinds of fevers and in the treatment of weak skin[257].

nrakta Eastern N. America. Naturalized in several areas of Britain[17]. ksacta Not known

propta Seed - surface sow in spring in a cold frame. Do not allow the compost to become dry. Pre-chilling the seed for two weeks can improve germination rates[134]. Germination usually takes place within 2 weeks at 20°c[134]. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn[200]. Very easy, larger divisions can be planted straight into their permanent positions whilst smaller clumps are best potted up and kept in a cold frame until they are growing away well. Basal cuttings in late spring. Harvest the shoots when they are about 10 - 15cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Landscape Uses:Container, Foundation, Massing, Rock garden, Seashore. Succeeds in most good garden soils[1], preferring one that is well-drained and moisture retentive[200]. Prefers a sunny position[200], but it also succeeds in partial shade[233]. Prefers a rich soil[1], but tolerates poor ones[233]. Plants are hardy to about -25°c[187]. A polymorphic species, there are many named varieties selected for their ornamental value[200]. Hybridizes freely with other members of this genus[200]. Plants need to be

divided every few years, preferably in the spring, in order to keep the plant vigorous[187]. Most species in this genus seem to be immune to the predations of rabbits[233]. Attracts butterflies and moths, it is also a good bee plant providing nectar in autumn[30]. Special Features: Attracts birds, North American native, Wetlands plant, Attracts butterflies, Suitable for cut flowers, Suitable for dried flowers. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone, 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

5.2.695 *Dactylis glomerata*

Cock's Foot, Orchardgrass, Ascherson's orchardgrass
4 tin 8 cyuc 0 kcaak 2 tcan 1 dwat 1 m hkuc
hmimhtut cyutli hgattcup hwicli hrasljutnyikfrip hpa7tli frusflatprikliwsslip hpa7tmwatli xre7t hjonli

drutta *Dactylis glomerata* is an evergreen Perennial growing to 1 m (3ft 3in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, in flower from May to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought.

pcista This plant is an important cause of hayfever[274].

tcanta Fodder Miscellany Soil stabilizationEnvironmental:Erosion control or dune stabilization, Land reclamation, Revegetation, Soil conservation. Plants form impenetrably dense clumps and when planted close together in drifts make an excellent ground cover[200]. Having a deep root system, the plant is also useful for checking soil erosion[269]. The plant can be grown for biomass, annual productivity ranges from 2 to 37 tonnes per hectare[269]. If soil fertility is low, a large portion of the total production occurs in the spring, but if the soil is highly fertile, production is well distributed throughout the growing season[269]. Animal feed, fodder, forage.

dwatta MiscellanyReported to be oestrogenic. the plant is a folk remedy for treating tumours, kidney and bladder ailments

nrakta Europe, including Britain, from Norway south and east to N. Africa and temperate Asia. ksacta Meadows, waste places, by roads and on downs[17].

propta Seed - surface sow in a cold frame in the spring and do not allow the compost to dry out[162]. Germination should take place within three weeks. When they are large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in the summer. There is between 725,000 and 1,450,000 seeds per kilo[269]. If you have sufficient seed it can be sown outdoors in situ in the spring. Division in spring[162]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Succeeds in most good soils and also under the shade of trees[1, 115, 162]. Prefers a light well-drained soil, it does not thrive on heavy or poorly drained soils[200]. Plants tolerate an annual precipitation in the range of 31 to 176cm, an annual temperature range of 4.3 to 23.8°C and a pH in the range of 4.5 to 8.2[269]. The plant is adapted to humid temperate climates. It grows on almost any type of soil, but thrives best on heavier types, such as clays and

juice of the plant is used in treating colds, croup, sore throats etc[257]. A poultice of the plant is applied externally to various infections such as sore throats, sores, swellings, chest and pleurisry pains[257].

nrakta N. America - Canada to Mexico. ksacta Ledges, gravels, rocky or wooded slopes and crests ascending to high altitudes[43]. Widely distributed on moist soils in mountainous and cool regions to 3500 metres[270].

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

nwatta An easily grown plant[203], it prefers a sunny position in a light well-drained soil[1]. Succeeds in clay soils[203]. Established plants are fairly drought tolerant[190]. Plants succeed in maritime gardens[233]. A very ornamental plant, it makes a very decorative edging to flower beds[K]. This species is self-sowing quite freely in our Cornwall garden[K]. The bulbs should be planted fairly deeply[1]. Most members of this genus are intolerant of competition from other growing plants[203], though this species has tolerated considerable neglect in our Cornwall garden[K]. The cultivar 'Major' is a more vigorous form with larger flower clusters[90]. Grows well with most plants, especially roses, carrots, beet and chamomile, but it inhibits the growth of legumes[18, 20, 54]. This plant is a bad companion for alfalfa, each species negatively affecting the other[201]. A widespread and very variable species[1]. It is closely allied to *A. stellatum*[1, 270]. Members of this genus are rarely if ever troubled by browsing deer[233]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is a bulb.

6.2.15 Allium fistulosum

Welsh Onion

5 tlin 9 cyuc 5 kcaak 2 tcan 2 dwat 0.6 m hkuc htut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Allium fistulosum is a BULB growing to 0.6 m (2ft) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista Although no individual reports regarding this species have been seen, there have been cases of poisoning caused by the consumption, in large quantities and by some mammals, of certain members of this genus. Dogs seem to be particularly susceptible[76].

kcaakta Edible Parts: Flowers Leaves RootEdible Uses: Bulb - raw or cooked[2]. A strong onion flavour, it can be used in salads, as a cooked vegetable or as a flavouring in cooked foods[22, K]. The bulbs are rather small, usually 10 - 25mm in diameter though they can be up to 45mm[266], and are sometimes used as spring onions[183]. A nutritional analysis is available[218]. Leaves - raw or cooked[2]. They have a mild onion flavour[183] and can be added to salads or cooked as a vegetable[116]. The leaves are often available all through the winter if the weather is not too severe[K]. They contain about 1.4% protein, 0.3% fat, 4.6% carbohydrate, 0.8% ash, some vitamin B1 and moderate levels of vitamin C[179]. Flowers - raw. A pleasant onion flavour, but they are rather on the dry side[K].

tcanta RepellentThe juice of the plant is used as a moth repellent. The whole plant is said to repel insects and moles[20].

dwatta Antibacterial Antifungal Antipyretic Diuretic Expectorant Stomachic Vitamin CThe bulb contains an essen-

tial oil that is rich in sulphur compounds[283]. It is antibacterial, antiseptic, diaphoretic, diuretic, galactogogue, stomachic, vermifuge and vulnerary[176, 218]. It is used in the treatment of colds and abdominal coldness and fullness[176]. A tea made from the roots is a children's sedative[218]. Use of the bulb in the diet impedes internal parasites[218]. Externally, the bulb can be made into a poultice to drain pus from sores, boils and abscesses[254].

nrakta E. Asia, possibly western China, though the original habitat is obscure. ksacta Cultivated for over 1000 years, it is not known in the wild.

propta Seed - sow spring in a greenhouse. The seed germinates over a wide range of temperatures, it is faster at higher temperatures[206]. Prick out the seedlings into individual pots when they are large enough to handle. When well-grown, the plants should be ready to be planted out in the summer. If they are not large enough at this time, grow them on in the greenhouse for their first winter and plant them out in late spring. Division of the plants is very easy and can be done at almost any time of the year though the spring is probably best. The divisions can be planted out straight into their permanent positions if required.

nwatta An easily grown plant[203], it prefers a sunny position in a light well-drained soil[1] but tolerates moist soils[1, 52] including those that are damp and acid[203]. Prefers a pH in the range 6.5 to 7.5[206], but it tolerates a pH in the range 4.9 to 7.5. A very hardy species, it is related to the cultivated onion (*A. cepa*) and could be of value in breeding programmes. It is sometimes cultivated in the garden for its edible leaves which can be produced throughout the winter if the weather is not too severe[K]. A very popular cultivated vegetable in the Orient[206], it probably arose through cultivation from *A. altaicum*[203]. The oriental forms of this species, known as bunching onions, tend to be harder and more robust than the Welsh onion[206]. There are two basic forms, multi-stem types and single-stem types. The single-stem types divide less freely than the multi-stems[206]. Plants will often retain their leaves even when covered in snow[206]. They are also tolerant of high temperatures and can be grown in the tropics[206]. The plants are often eaten by slugs[K]. The bulbs should be planted fairly deeply[1]. Most members of this genus are intolerant of competition from other growing plants[203]. Grows well with most plants, especially roses, carrots, beet and chamomile, but it inhibits the growth of legumes[18, 20, 54]. This plant is a bad companion for alfalfa, each species negatively affecting the other[201]. Members of this genus are rarely if ever troubled by browsing deer[233]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is a bulb.

6.2.16 Allium schoenoprasum

Chives, Wild chives, Flowering Onion

5 tlin 11 cyuc 5 kcaak 3 tcan 2 dwat 0.3 m hkuc hmimhtut cyutli tcup hwicli hrasljutnyikfrp hpa7tli flatprikliwisslip hpa7tmwatli fyfjxre7t hjonli

drutta Allium schoenoprasum is a BULB growing to 0.3 m (1ft) by 0.3 m (1ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf from February to December, in flower from June to July, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no individual reports regarding this species have been seen, there have been cases of poisoning caused by the consumption, in very large quantities and by some mammals, of certain members of this genus. Dogs seem to be particularly susceptible[76].

kcaakta Edible Parts: Flowers Leaves RootEdible Uses: Leaves - raw, cooked or dried for later use. The leaves have a

embryo. The orchid soon begins to digest the fungal tissue and this acts as a food supply for the plant until it is able to obtain nutrients from decaying material in the soil[200]. It is best to use some of the soil that is growing around established plants in order to introduce the fungus, or to sow the seed around a plant of the same species and allow the seedlings to grow on until they are large enough to move. Division of the tubers as the flowers fade[230]. This species produces a new tuber towards the end of its growing season. If this is removed from the plant as its flowers are fading, the shock to the plant can stimulate new tubers to be formed. The tuber should be treated as being dormant, whilst the remaining plant should be encouraged to continue in growth in order to give it time to produce new tubers[230]. Division can also be carried out when the plant has a fully developed rosette of leaves but before it comes into flower[230]. The entire new growth is removed from the old tuber from which it has arisen and is potted up, the cut being made towards the bottom of the stem but leaving one or two roots still attached to the old tuber. This can often be done without digging up the plant. The old tuber should develop one or two new growths, whilst the new rosette should continue in growth and flower normally[230].

nwatta Needs to be grown in the shade and humus-rich soil of a woodland garden[230]. Orchids are, in general, shallow-rooting plants of well-drained low-fertility soils. Their symbiotic relationship with a fungus in the soil allows them to obtain sufficient nutrients and be able to compete successfully with other plants. They are very sensitive to the addition of fertilizers or fungicides since these can harm the symbiotic fungus and thus kill the orchid[230]. Plants have proved to be amenable to cultivation[230].

5.2.740 Waldsteinia ternata

Barren Strawberry

4 tlin 8 cyuc 0 kcaak 3 tcan 0 dwat 0.2 m hkuc hmimhtut cyutli hgattcup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli hjonli

drutta Waldsteinia ternata is an evergreen Perennial growing to 0.2 m (0ft 6in) by 0.5 m (1ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. It cannot tolerate atmospheric pollution.

tcanta Ground Cover. Food Forest, Accent: Good Texture/Form, Containers, Edging, Rabbit Resistant.

nrakta Native Range: Europe, Japan, China ksacta Moist or dry upland conifer forests, mixed hardwood and pine woodlands, thickets, clearings and fields.

propta Propagate by division in early spring. nwatta Herbaceous rhizomatous perennial. A dense mat of shiny dark green leaves similar to a strawberry plant. Saucer-shaped, bright yellow flowers. A very good low maintenance ground cover. Evergreen in mild winter regions. Tolerates light foot traffic. Easily divided in spring or early fall. Combines well with spring-blooming bulbs. Drought tolerant once established. Light: Partial Shade or Full Shade. Soil Type: Normal, Sandy or Clay. Soil pH: Neutral to Acid. Soil Moisture: Average or Moist. Dislikes heat and humidity. Growth Rate: Fast. Bloom Time: Early spring to summer.

5.2.741 Asplenium scolopendrium

Hart's Tongue Fern

4 tlin 8 cyuc 0 kcaak 0 tcan 2 dwat 0.6 m hkuc pcmhmim cyutli kyucutcup hwicli hrasljutnyikfrp hpa7tli flatprikliwisslip hpa7tmwatli hjonli

drutta Asplenium scolopendrium is an evergreen Fern growing to 0.6 m (2ft) by 0.5 m (1ft 8in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf all year, and the seeds ripen from July to August. Suitable for: light (sandy) and medium (loamy) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers dry or moist soil.

pcista Although we have found no reports of toxicity for this species, a number of ferns contain carcinogens so some caution is advisable[200]. Many ferns also contain thiaminase, an enzyme that robs the body of its vitamin B complex. In small quantities this enzyme will do no harm to people eating an adequate diet that is rich in vitamin B, though large quantities can cause severe health problems. The enzyme is destroyed by heat or thorough drying, so cooking the plant will remove the thiaminase[172].

tcanta CosmeticA good ground cover plant for shady positions[28, 200], so long as it is planted no more than 30cm apart each way[208]. Plants form a slowly spreading clump[208]. A decoction of the fronds is used cosmetically as a hair wash to counteract greasy skin and also as a face pack for delicate skin[7].

dwatta Astringent Cholagogue Diaphoretic Diuretic Dysentery Expectorant VulneraryThe fronds are astringent, cholagogue, diaphoretic, diuretic, expectorant, vulnerary[4, 7, 9, 165]. Externally it is used as an ointment in the treatment of piles, burns and scalds[4]. An infusion is taken internally for the treatment of diarrhoea, dysentery, gravelly deposits of the bladder and for removing obstructions of the liver and spleen[4]. The fronds are harvested during the summer and can be dried for later use[7].

nrakta Central and southern Europe, including Britain, and N. Africa and eastwards to Japan. ksacta Moist banks and walls[4], rocks in damp shady places in woodlands[7, 9, 31], often on lime-rich soils[187].

propta Spores - best sown as soon as they are ripe on the surface of a humus-rich sterilized soil. Keep the compost moist, preferably by putting a plastic bag over the pot. The spores usually germinate in the spring[1]. Spring sown spores germinate in 1 - 3 months at 15°C[134]. Pot on small clumps of plantlets as soon as they are large enough to handle and grow them on in light shade in a greenhouse. Keep the plants humid until they are well established. Once the plants are 15cm or more tall, plant them out into their permanent positions in the spring. Division in spring. Leaf bases - dig up the plant and wash off the soil until the old caudex covered with 'dead' leaf bases can be clearly seen. Strip off these bases individually by peeling them down the caudex. At the point of attachment they will be green. Young plants can be raised by planting these leaf bases, green tip up, in a pot of loam-based compost and enclosing the pot in a plastic bag. Within one month green swellings will appear around the original point of attachment to the caudex, each of these will develop quite quickly into a young fern. It takes 3 months in summer but longer in winter[200].

nwatta Easily grown in a shady position in a soil that is rich in leaf-mould[187]. Prefers a light sandy soil[1]. Succeeds on chalk[28]. Plants can be grown on drystone walls[219]. Grows well in heavy clay soils. Prefers a shady position with no more than 3 hours sunlight a day, greater exposure will cause yellowing and burning of the leaves[187]. One report says that it succeeds in dry shade[188]. Requires a pH of 6 or more in order to flourish. Plants are hardy to about -30°C[187], they grow very well in SW. England[31]. A very adaptable plant[28]. There are many named forms, selected for their ornamental value[187, 200]. Members of this genus are rarely if ever troubled by browsing deer[233].

5.2.742 Limonium carolinianum

Sea Lavender, Lavender thrift

4 tlin 8 cyuc 0 kcaak 0 tcan 1 dwat 0.6 m hkuc htut cyutli kyucutcup hwicli hrasljutnyik hpa7tli flatprikliwissom hpa7tmwatli fyfjxre7t hjonli

drutta Limonium carolinianum is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in saline soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

dwatta Astringent DysenteryThe roots contain tannin and are powerfully astringent[4, 207]. A decoction of the root has long been used as a popular domestic remedy for diarrhoea, dysentery etc and are also used to treat sore mouths,

cankers etc[4, 207]. The dried and powdered root is applied to old ulcers or piles[4].

nrakta Eastern N. America - Labrador to Florida and Texas. ksacta Coastal salt flats[200].

propta Seed - sow spring in a greenhouse. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring. Very difficult[200].

nwatta Requires a well drained soil and a sunny position[200]. Plants are well-suited to coastal gardens and dry soils[200]. Hardy to about -20°c[200].

5.2.743 Anemone cylindrica

Candle Anemone

4 tlin 8 cyuc 0 kcak 0 tcan 2 dwat 0.5 m hkuc hmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyfxre7t hjonli

drutta Anemone cylindrica is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

pcista Although no specific mention has been seen for this species, many members of this genus contain protoanemonin, an irritating acrid oil that is an enzymatic breakdown product of the glycoside ranunculin. While protoanemonin can cause severe topical and gastrointestinal irritation, it is unstable and changes into harmless anemonin when plants are dried or heated[4, 10, 19, 65, 270].

dwatta Antiseptic Miscellany Ophthalmic PoulticeThe root of this plant was one of the most highly esteemed medicines of the Omaha and Ponca Indians[213]. A wash of the pounded boiled root was applied externally to wounds[213]. The root contains anemonin, which is said to be a potent antiseptic[213]. A poultice made from the leaves is used to treat burns[207, 257]. A tea of the roots was used in the treatment of headaches and dizziness[213, 257]. A decoction of the stem and fruit is used as a wash for sore eyes[257].

nrakta Western N. America - British Columbia to New Mexico, east to South Dakota and New Jersey. ksacta Prairies, dry, open woods, pastures and roadsides at elevations from 300 - 3000 metres[270].

propta Seed - best sown in a cold frame as soon as it is ripe in the summer[1]. Surface sow or only just cover the seed and keep the soil moist. Sow stored seed as soon as possible in late winter or early spring. The seed usually germinates in 1 - 6 months at 15°c[133]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for at least their first year. When the plants are large enough, plant them out in the spring. Division in late summer after the plant dies down.

nwatta Succeeds in ordinary garden soil but prefers a well-drained woodland soil and some shade[200]. Plants succeed in maritime gardens[233]. Hardy to at least -20°c[187]. Plants seem to be immune to the predations of rabbits[233]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54]. A good woodland plant[1, 187].

5.2.744 Apocynum venetum

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

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Apocynum venetum is a PERENNIAL growing to 0.3 m (1ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All parts of the plant are poisonous[1, 62].

tcanta FibreThe bark yields a fibre that is used for making twine, bags, linen etc[46, 61]. It can be harvested after the leaves fall in autumn but is probably at its best as the seed pods are forming[169]. The dogbane-milkweed family Asclepias, Apocynum, Calotropis, and Trachomitum spp) has been used for fiber industrial crops for millennia with a number in cultivation as regional crops. All of these crops are dual-purpose fibres, offering bast fibres from the stem and seed fiber or 'floss' in the fruit pods. Many have also been identified as potential hydrocarbon crops due to high latex content. Could be integrated into various agroforestry systems rather than as monocultures [1-1].

dwatta Cardiotonic Diuretic HypotensiveThe leaves or the whole herb is cardiotonic, diuretic and hypotensive[176, 218]. It is used in the treatment of hypertensive headache, dizziness, insomnia, irritability, oliguria and nephritic oedema[176]. It increases the renal blood flow and can be used for renal and cardiac oedema and ascites of liver cirrhosis[176].

nrakta S. Europe. N. Africa - Syria. ksacta Swamps, wet places and maritime sands[1, 50].

propta Seed - best sown as soon as it is ripe in late summer and overwintered outdoors. The seed requires a period of cold stratification if it is to germinate well[238]. Prick out the seedlings when large enough to handle and grow them on in a cold frame for their first winter, planting out in late spring of the following year[K]. Division in spring just before active growth begins[200]. Plants can also be divided in the autumn[238].

nwatta Industrial Crop: Fiber Management: Hay Regional CropSucceeds in sun or shade in most well-drained but moisture-retentive soils[1, 200]. Plants can be invasive[200]. The flowers are attractive to bees.

5.2.745 Delphinium cashmerianum

4 tlin 8 cyuc 0 kcak 0 tcan 1 dwat 0.5 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Delphinium cashmerianum is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to July, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista All parts of the plant are toxic[65, 172]. The plant is most toxic when it is young[200].

tcanta Miscellany Oil ParasiticideThe following uses are for the closely related *D. brunonianum*. They probably also apply for this species:- A parasiticide is obtained from the leaves[51, 61]. It is quite toxic and so is for external use only. In the Himalayas it is only used to destroy ticks on animals[51, 240]. The seed contains 30% of an oil that has industrial uses[91]. The seed is very small, however, and it would require a large area of plants to obtain reasonable yields.

dwatta Miscellany ParasiticideOne report says that the roots are used medicinally, but gives no further details[240].

nrakta E. Asia - Western Himalayas in Kashmir and Tibet. ksacta Alpine areas from 3000 to 4800 metres[240].

propta Seed - sow March/April in a cold frame or May outdoors[111]. Keep moist and in a shady position until germination takes place[175]. The seed has a limited viability so it should be stored in a sealed container at about 3°c[200]. Temperatures above 15°c inhibit germination[175]. The seed usually germinates in 2 - 9 weeks at 15°c[175]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in the summer. Cuttings of basal shoots in April/May, taken before they become hollow at the base, and planted in a cold frame[111]. Division in spring[111] or early autumn[200].

nwatta Prefers a rich well-drained soil that stays moist in the summer[111, 187]. Dislikes water-logged soils[200], it is liable to die out in heavy soils over winter[111]. Requires an open sunny position[188]. Plants are generally hardy to about -20°c[187]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54]. Grows well

is heavy[222]. The bulb is said to be anthelmintic, antiasthmatic, anticholesterolemic, antiseptic, antispasmodic, cholagogue, diaphoretic, diuretic, expectorant, febrifuge, stimulant, stomachic, tonic, vasodilator[4, 9, 14, 21, 46, 165]. The crushed bulb may be applied as a poultice to ease the pain of bites, stings etc[4, 9, 14, 21].

nrakta S. Europe to W. Asia. Possibly native in Britain in S.W. England and Wales[17]. ksacta Rocky places near the coast in S.W. England and Wales[17].

propta Seed - best sown as soon as it is ripe in a cold frame, though it can also be sown in a cold frame in the spring[200]. Prick out the seedlings into individual pots when they are large enough to handle. Well-grown plants can be planted out into their final positions in late summer or the autumn, otherwise grow them on for a further year in pots and plant them out the following summer. Division in late summer or early autumn. Dig up the bulbs when the plants are dormant and divide the small bulblets at the base of the larger bulb. Replant immediately, either in the open ground or in pots in a cold frame. Bulbils - plant out as soon as they are ripe in late summer. The bulbils can be planted direct into their permanent positions, though you get better results if you pot them up and plant them out the following spring.

nwatta Prefers a sunny position in a light well-drained soil[1]. Prefers a dry position[45]. Succeeds in clay soils[203]. Tolerates a pH in the range 5.2 to 8.3. The bulbs should be planted fairly deeply[1]. The wild leek is a rare native of Britain, found only in the south-west and Wales, though it should be hardy in most parts of the country. It comes into growth in the autumn, dying down in the summer, and makes a very pleasant winter leaf, either raw or cooked. It is a rather variable plant, especially in the amount of flowers and bulbils produced. The species produces mainly flowers with almost no bulbils, whilst the sub-species *A. ampeloprasum babbingtonii* (Babington's Leek) produces lots of bulbils and almost no flowers[17]. The cultivated leek (*A. ampeloprasum porrum*) is believed to have been developed from this plant whilst, in Germany and Italy, other forms have been selected for their edible bulbils[142]. Allium ampeloprasum comprises several vegetables, of which the most important ones are: leek, elephant garlic or great-headed garlic, pearl onion, kurrat, Egyptian leek or salad leek, and Persian leek (*Allium ampeloprasum ssp. persicum*). The cultivar 'Perizweibel' is often used, the bulbils are solid rather than made up of layers and are popularly used for making pickles[183]. This cultivar does not set seed[183]. Another cultivated form of this plant produces very large, mild-garlic flavoured bulbs that are up to 500g in weight[183]. They are known as elephant garlic[183]. The wild leek grows well with most plants, especially roses, carrots, beet and chamomile, but it inhibits the growth of legumes[18, 20, 54]. This plant is a bad companion for alfalfa, each species negatively affecting the other[201]. Members of this genus are rarely if ever troubled by browsing deer[233]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is a bulb.

6.2.13 Ribes x culverwellii

Jostaberry

5 tlin 9 cyuc 5 kcak 0 tcan 0 dwat 1.8 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyfxre7t hjonli

drutta Ribes x culverwellii is a deciduous Shrub growing to 1.8 m (6ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf from April to October; in flower from April to May, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked in pies, jams etc[200]. Intermediate in size and flavour between gooseberries and blackcurrants, tasting more like a gooseberry when under-ripe and more like a

blackcurrant when fully ripe[K]. The fruit is rich in vitamin C[183].

nrakta A range of garden hybrids. ksacta Not known in the wild.

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. Stored seed requires 3 months cold stratification at between 0 and 5°c and should be sown as early in the year as possible[113, 164]. Under normal storage conditions the seed can remain viable for 17 years or more. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter, planting them out in late spring of the following year. This plant is a cultivar and will not breed true from seed. Cuttings of half-ripe wood, 10 - 15cm with a heel, July/August in a frame[78, 113]. Cuttings of mature wood of the current year's growth, preferably with a heel of the previous year's growth, November to February in a cold frame or sheltered bed outdoors[78, 200].

nwatta Easily grown in a moisture retentive but well-drained loamy soil of at least moderate quality[11, 200]. Best grown on a deep sandy loam[1]. Dislikes very heavy clay, chalky soils and thin dry soils, but it can succeed on most soil types if plenty of organic matter is incorporated[1]. Quite tolerant of shade though not fruiting so well in such a position[11]. A group of cultivars of hybrid origin, basically a cross between blackcurrants and gooseberries. Very vigorous plants, producing prolific crops of fruit. They are being grown increasingly in gardens. In general they resist American gooseberry mildew, blackcurrant leaf spot and gall mite. Plants in this genus are notably susceptible to honey fungus[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multi-stemmed with multiple stems from the crown [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

6.2.14 Allium cernuum

Nodding Onion, New Mexican nodding onion

5 tlin 9 cyuc 5 kcak 2 tcan 2 dwat 0.5 m hkuc htut cyutli gattucp hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Allium cernuum is a BULB growing to 0.5 m (1ft 8in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf from February to December, in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil and can tolerate drought. The plant can tolerate maritime exposure.

pcista Although no individual reports regarding this species have been seen, there have been cases of poisoning caused by the consumption, in large quantities and by some mammals, of certain members of this genus. Dogs seem to be particularly susceptible[76].

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Bulb - raw or cooked[2, 22, 161]. Strongly flavoured[46, 61, 159], it is mainly used as a flavouring[183, K]. The bulb is about 50mm tall and 15mm wide[235]. Leaves - raw or cooked[62, 85, 159]. A delicious, strong-onion flavour, they are very nice in salads[K]. The leaves are available from spring until the autumn and are one of the most favourite onions we are growing on our Cornish trial grounds[K]. Flowers - raw or cooked. A delicious strong onion flavour, somewhat stronger than the leaves especially if the seeds are starting to set[K]. They make a very decorative and tasty addition to the salad bowl[K].

tcanta RepellentThe juice of the plant is used as a moth repellent. The whole plant is said to repel insects and moles[20]. The juice can be applied to exposed skin in order to repel biting insects[257].

dwatta Lithontripic PoulticeThe whole plant has mild medicinal activity similar to the action of garlic (*Allium sativum*)[222]. It is used specifically as a poultice on the chest for the treatment of respiratory ailments and the juice has been used in the treatment of kidney stones[222]. The

pcimhmihtut cyutli hgattcup hwicli hyhshrasljutnyik hpa7tli frusflatprikhwisslip hpa7tmwatli fyifxre7t hjonli

drutta *Rubus fruticosus* is a deciduous Shrub growing to 3 m (9ft) by 3 m (9ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf from March to November, in flower from May to September, and the seeds ripen from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects, Apomictic (reproduce by seeds formed without sexual fusion). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure.

kcakta Edible Parts: Fruit Leaves Root ShootsEdible Uses: TeaFruit - raw or cooked[5, 7, 9, 12, 183]. The best forms have delicious fruits and, with a range of types, it is possible to obtain ripe fruits from late July to November[K]. The fruit is also made into syrups, jams and other preserves[238]. Some people find that if they eat the fruit before it is very ripe and quite soft then it can give them stomach upsets[K]. Root - cooked. The root should be neither to young nor too old and requires a lot of boiling[7]. A tea is made from the dried leaves[21] - the young leaves are best[61]. The leaves are often used in herbal tea blends[238]. Young shoots - raw. They are harvested as they emerge through the ground in the spring, peeled and then eaten in salads[244].

tcanta Dye Fibre PioneerA purple to dull blue dye is obtained from the fruit[168]. A fibre is obtained from the stem and used to make twine[66]. Plants are spread by seed deposited in the droppings of birds and mammals. They often spring up in burnt-over, logged or abandoned land and make an excellent pioneer species, creating the right conditions for woodland trees to move in. The trees will often grow in the middle of a clump of blackberries, the prickly stems protecting them from rabbits[K].

dwatta Antidiarrhoeal Astringent Depurative Diuretic Dysentery Tonic VulneraryThe root-bark and the leaves are strongly astringent, depurative, diuretic, tonic and vulnerary[4, 7, 9, 165, 254]. They make an excellent remedy for dysentery, diarrhoea, haemorrhoids, cystitis etc, the root is the more astringent[4, 238]. Externally, they are used as a gargle to treat sore throats, mouth ulcers and gum inflammations[238, 254]. A decoction of the leaves is useful as a gargle in treating thrush and also makes a good general mouthwash[7].

nrakta Europe, including Britain, to the Mediterranean Macaronesia. ksacta A very common and adaptable plant, found in hedgerows, woodland, meadows, waste ground etc[17, 244].

propta Seed - requires stratification and is best sown in early autumn in a cold frame. Stored seed requires one month stratification at about 3°C and is best sown as early as possible in the year. Prick out the seedlings when they are large enough to handle and grow on in a cold frame. Plant them out into their permanent positions in late spring of the following year. Cuttings of half-ripe wood, July/August in a frame[200]. Tip layering in July. Plant out in autumn. Division in early spring or just before leaf-fall in the autumn[200].

nwatta Easily grown in a good well-drained loamy soil[1, 11, 200]. Succeeds in acid and calcareous soils[186]. Tolerates poor soils[202]. Established plants are drought resistant[132]. Succeeds in sun or semi-shade[1, 11, 200], though it fruits less well in the shade[202]. Plants will also fruit when grown in fairly deep shade or against a north facing wall, though the fruit will ripen later[219]. Plants tolerate quite severe exposure[186]. Hardy to at least -18°C[202]. *R. fruticosus* is an aggregate species made up of several hundred slightly differing species. The reason for this is that most seed is produced by a non-sexual method (Apomixis) and is therefore genetically identical to the parent plant. On occasions when sexual production of seed takes place the offspring will all be slightly different from the parent plant and will then usually reproduce as a new species by means of apomixy. Modern treatment of this aggregate usually does not use the name *R. fruticosus* because of the confusion over which species it should apply to, the type species of the aggregate should be called *R. ulmifolius*[150]. The following

members of the aggregate have been highly recommended for their fruit[150]. *R. badius*. *R. cyclophorus*. *R. gratus*. *R. nemoralis*. *R. oxyanthus*. *R. pyramidalis*. *R. separianus*. *R. winteri*. The following members are said to be nearly as good. *R. balfourianus*. *R. broensis*. *R. carpinifolius*. *R. foliosus*. *R. fuscoviridis*. *R. infestus*. *R. insericatus newbouldianus*. *R. koehleri*. *R. largifuscus*. *R. londinensis*. *R. ludensis*. *R. macrophyllus*. *R. obscurus*. *R. pseudo-bifrons*. *R. rhombifolius*. *R. riddelsdellii*. *R. scaber*. *R. thyrsoiflorus*. *R. vallisparsus*. *R. vestitus*. Plants form dense thickets and this makes excellent cover for birds[186]. They regenerate freely after being cut back[186]. This species is also a good plant for bees and butterflies[24]. This species has biennial stems, it produces a number of new stems each year from the perennial rootstock, these stems fruit in their second year and then die[200]. Plants in this genus are notably susceptible to honey fungus[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a running thicket former forming a colony from shoots away from the crown spreading indefinitely [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

6.2.12 Allium ampeloprasum

Wild Leek, Broadleaf wild leek

5 tlin 9 cyuc 5 kcaak 2 tcan 3 dwat 1.8 m hkuc

htut cyutli kyuctcup hwicli hrasljutnyikfrip hpa7tli flatprikhwisslip hpa7tmwatli xre7t hjonli

drutta *Allium ampeloprasum* is a BULB growing to 1.8 m (6ft) by 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf from October to August, in flower from July to August, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate strong winds but not maritime exposure.

pcista Although no individual reports regarding this species have been seen, there have been cases of poisoning caused by the consumption, in large quantities and by some mammals, of certain members of this genus. Dogs seem to be particularly susceptible[76].

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Bulb - raw or cooked[2, 27, 61, 105]. The small bulbs can vary considerably in size from 2 - 6cm[200], they have a fairly strong leek to garlic flavour and are nice as a flavouring in cooked foods[K]. The bulbs of selected cultivars are very large with a mild garlic flavour[183]. Leaves - raw or cooked[2]. A pleasant mild to strong garlic flavour, they are available from late autumn to the spring though they can become rather tough and fibrous as they get older[K]. Flowers - raw. A similar flavour to the leaves but they have a somewhat dry texture and are best used as a flavouring in cooked foods[K]. The bulbs have a mild garlic flavour and make a nice flavouring in salads and cooked foods. Although produced abundantly, they are quite fiddly to use because they are small[K]. They can also be pickled[142].

tcanta RepellentThe juice of the plant is used as a moth repellent. The whole plant is said to repel insects and moles[20].

dwatta Anthelmintic Antiasthmatic Anticholesterolemic Antiseptic Antispasmodic Cholagogue Diaphoretic Diuretic Expectorant Febrifuge Stimulant Stings Stomachic Tonic VasodilatorThis species has the same medicinal virtues as garlic, but in a much milder and less effective form[238]. These virtues are as follows: Garlic has a very long folk history of use in a wide range of ailments, particularly ailments such as ringworm, Candida and vaginitis where its fungicidal, antiseptic, tonic and parasitidal properties have proved of benefit[218]. It is also said to have anticancer activity[218]. Daily use of garlic in the diet has been shown to have a very beneficial effect on the body, especially the blood system and the heart. For example, demographic studies suggest that garlic is responsible for the low incidence of arteriosclerosis in areas of Italy and Spain where consumption of the bulb

in the rock garden[188]. This species is closely related to *C. brunonianum*[200].

5.2.746 Asarum europaeum

Asarabacca, European Wild Ginger

4 tlin 8 cyuc 0 kcaak 0 tcan 2 dwat 0.1 m hkuc

pcimhmihtut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikhwisslip hpa7tmwatli fyifxre7t hjonli

drutta *Asarum europaeum* is an evergreen Perennial growing to 0.1 m (0ft 4in) by 0.5 m (1ft 8in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in leaf all year, in flower from May to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

pcista The plant is poisonous in large doses[13, 19], the toxin is neutralized by drying[7].

tcanta DyeA vibrant apple-green dye is obtained from plant[7, 244]. A useful ground cover for a shady position so long as it is not dry[197], spreading by its roots[208].

dwatta Cathartic Diaphoretic Emetic Errhine Sternutatory Stimulant TonicAsarabacca has a long history of herbal use dating back at least to the time of the ancient Greeks, though it is little used in modern herbalism[268]. The root, leaves and stems are cathartic, diaphoretic, emetic, errhine, sternutatory, stimulant and tonic[4, 7, 9, 13, 21, 46, 240]. The plant has a strong peppery taste and smell[244]. It is used in the treatment of affections of the brain, eyes, throat and mouth[4, 19]. When taken as a snuff, it produces a copious flow of mucous[268]. The root is harvested in the spring and dried for later use[7]. Use with caution[21], see the notes above on toxicity. An essential oil in the root contains 50% asarone and is 65% more toxic than peppermint oil[240]. This essential oil is the emetic and expectorant principle of the plant and is of value in the treatment of digestive tract lesions, silicosis, dry pharyngeal and laryngeal catarrh etc[240].

nrakta Central and southern Europe, east to W. Asia. Naturalized in Britain[17]. ksacta Open woodland and waterside thickets[13, 19], especially in beech woodlands[7].

propta Seed - best sown in a cold frame as soon as it is ripe in the summer[134]. Stored seed will require 3 weeks cold stratification and should be sown in late winter[134]. The seed usually germinates in the spring in 1 - 4 or more weeks at 18°C[134]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for at least their first winter. Plant them out when large enough in late spring. Division in spring or autumn. Plants are slow to increase[200]. It is best to pot the divisions up and keep them in light shade in the greenhouse until they are growing away strongly.

nwatta Landscape Uses:Border, Ground cover, Massing, Rock garden, Woodland garden. Prefers a rich moist neutral to acid soil in woodland or a shady position in the rock garden[1, 200]. Other reports say that this plant prefers a calcareous soil[13, 19, 268]. Plants are hardy to at least -15°C[200]. The flowers are malodorous and are pollinated by flies[200]. The root has a pungent, aromatic smell like mild pepper and ginger mixed, but more strongly aromatic. Plants often self-sow when growing in a suitable position[200]. This plant was at one time commonly cultivated as a medicinal herb[17]. Special Features: Attractive foliage, Not North American native, Naturalizing, Inconspicuous flowers or blooms.

5.2.747 Verbena urticifolia

White Verbain

4 tlin 8 cyuc 0 kcaak 0 tcan 1 dwat 0.3 m hkuc

htut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikhwisslip hpa7tmwatli fyifxre7t hjonli

drutta *Verbena urticifolia* is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable

for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

dwatta Miscellany Restorative Women's complaintsA decoction of the root is given to babies to break out the hives[207]. The sweetened root decoction is drunk as an aid for flu[207]. An infusion of the root has been used in the treatment of profuse menstruation[257]. The root has been eaten to revive a patient and restore them to health[257].

nrakta Eastern N. America - Quebec and Ontario to North Dakota, south to Florida and Texas. ksacta Woodlands, pastures, along streams, roadsides and waste areas[228].

propta Seed - sow early spring in a greenhouse or cold frame[1]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring. Basal cuttings in early summer. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Succeeds in any moderately fertile well-drained but moisture retentive soil in a sunny position[1, 200]. Hardy to about -15°C[200].

5.2.748 Actaea spicata

Herb Christopher, Baneberry

4 tlin 8 cyuc 0 kcaak 0 tcan 1 dwat 0.5 m hkuc

pcimhmihtut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikhwisslip hpa7tmwatli xre7t hjonli

drutta *Actaea spicata* is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to June, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Beetles, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

pcista All parts of plant are poisonous but rarely fatal[4, 10, 13, 19, 65, 76].

tcanta Dye RepellentThe smell of the plant is reputed to drive away vermin[4]. A black dye is obtained from the berries when alum is used as a mordant[4, 13, 74, 100]. The seeds contain tannin[240].

dwatta Antidote Antispasmodic Cytostatic NervineThe root is antispasmodic, cytostatic, emetic, nervine and purgative[4, 17, 65, 240]. In Canada the root is used in the treatment of snakebite[211]. It is also considered useful in the treatment of nervous disorders and rheumatic fever[211]. In India it is used in the treatment of rheumatism, goitre and asthma[240]. This remedy should be used with some caution, see the notes above on toxicity.

nrakta Most of Europe, including Britain, through temperate and arctic Asia to China. ksacta Ash woods on limestone and in damp stony woods to 1500 metres[13, 17].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame or outdoors in a moist shaded seedbed[200]. The seed has a limited viability[200], it can also be sown in spring in a cold frame but germination rates may be poor. When they are large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in late spring or early summer of the following year. Division in March or October.

nwatta Succeeds in most conditions[233], but prefers a humus-rich moist soil in light shade doing well amongst shrubs and in light woods[1, 200]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

5.2.749 Limonium vulgare

Sea Lavender, Mediterranean sea lavender, Common Privet

4 tlin 7 cyuc 0 kcaak 0 tcan 1 dwat 0.3 m hkuc

hmimhtut cyutli kyuctcup hwicli hrasljutnyik hpa7tli flat-prikwlshsom hpa7tmwatli fyfkr7t hjonli

drutta Limonium vulgare is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies, bees, wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in saline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

tcanta Repellent TanninThe plant repels moths[66]. The root is a source of tannin[46].

dwatta Decongestant DepurativeThe roots are decongestant and depurative[66]. They are used in the treatment of consumption with haemorrhage[257].

nrakta Western and southern Europe, including Britain, N. Africa, N. America. ksacta Muddy salt marshes, avoiding shade[17].

propta Seed - sow spring in a greenhouse. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring. Very difficult[200]. Root cuttings in late autumn or winter[200].

nwatta Landscape Uses:Border, Hedge, Screen, Superior hedge. Succeeds in light dry soils[1]. Tolerates maritime exposure[200]. A good bee plant[108]. Special Features: Not North American native, Invasive, Naturalizing, Attractive flowers or blooms.

5.2.750 *Cypripedium calceolus pubescens*

Nerve Root

4 tin 8 cyuc 0 kcak 0 tcan 3 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatprik-wisslip hpa7tmwatli xre7t hjonli

drutta *Cypripedium calceolus pubescens* is a PERENNIAL growing to 0.6 m (2ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Contact with the fresh plant can cause dermatitis in sensitive people[1, 21]. Large doses can cause hallucinations[268]. Large doses may result in dizziness, restlessness, headaches, mental excitement and visual hallucinations. Avoid with allergies. Avoid during pregnancy [301].

dwatta Antidiarrhoeal Antispasmodic Diaphoretic Hypnotic Nervine Sedative TonicNerve root has a high reputation for its sedative and relaxing effect on the nervous system[238, 254]. The root is a pungent bitter-sweet herb with an unpleasant odour. It was much used by the North American Indians who used it as a sedative and antispasmodic to ease menstrual and labour pains and to counter insomnia and nervous tension[238, 254]. The root is antispasmodic, diaphoretic, hypnotic, nervine, sedative, tonic[21, 46, 165, 192, 222, 238]. It is taken internally in the treatment of anxiety, nervous tension, insomnia, depression and tension headaches[238]. The active ingredients are not water soluble and so the root is best taken in the form of a tincture[222]. The plant is said to be the equivalent of Valerian (*Valeriana officinalis*) in its effect as a nervine and sedative, though it is less powerful[1, 4]. Another report says that its restorative effect appears to be more positive than that of valerian[254]. The roots are harvested in the autumn and are dried for later use[238]. In the interests of conservation, it is best not to use this herb unless you can be certain it was obtained from a cultivated source - see the notes above under cultivation details[K].

nrakta N. America to E. Asia - Japan. ksacta Rich woods and meadows[21, 43]. Mesc deciduous and coniferous forest, openings, thickets, prairies, meadows and fens at elevations of 0 - 2900 metres[270].

propta Seed - surface sow, preferably as soon as it is ripe, in the greenhouse and do not allow the compost to dry out. The seed of this species is extremely simple, it has a minute embryo surrounded by a single layer of protective cells. It contains very little food reserves and depends upon a symbiotic relationship with a species of soil-dwelling fungus. The fungal hyphae invade the seed and enter the cells of the embryo. The orchid soon begins to digest the fungal tissue and this acts as a food supply for the plant until it is able to obtain nutrients from decaying material in the soil[200]. It is best to use some of the soil that is growing around established plants in order to introduce the fungus, or to sow the seed around a plant of the same species and allow the seedlings to grow on until they are large enough to move. Division with care in early spring, the plants resist disturbance[200]. Remove part of the original rootball with the soil intact[200]. Division is best carried out towards the end of the growing season, since food reserves are fairly evenly distributed through the rhizome[230]. Small divisions of a lead and two buds, or divisions from the back (older) part of the rhizome without any developed buds, establish quickly using this method[230]. Replant immediately in situ[230].

nwatta Succeeds in shade or full sun so long as there is adequate moisture[42]. Grows well in a woodland garden[230]. Plants are best grown on a north or north-west aspect in order to slow down early growth[1]. Requires a humus rich soil with plenty of moisture in the growing season[42], it also succeeds in chalky soils[200]. Must not be planted too deeply[42]. A very ornamental plant[1] it is long-lived when once established, though it is very difficult to establish a plant[233]. The flowers have a soft, rose-like aroma[245]. Plants are growing very well at the Savill Gardens in Windsor[233]. This plant is becoming very rare in the wild due to overcollecting for medicinal usage[238]. Reports that the plant is cultivated for its medicinal uses are largely spurious and, unless you can be certain that the root has come from a cultivated source, it is best not to use this plant medicinally but to use suitable substitutes such as *Scutellaria laterifolia* and *Lavandula angustifolia*[238]. Orchids are, in general, shallow-rooting plants of well-drained low-fertility soils. Their symbiotic relationship with a fungus in the soil allows them to obtain sufficient nutrients and be able to compete successfully with other plants. They are very sensitive to the addition of fertilizers or fungicides since these can harm the symbiotic fungus and thus kill the orchid[230].

5.2.751 *Anemone nemorosa*

Wood Anemone, European thimbleweed

4 tin 8 cyuc 0 kcak 0 tcan 1 dwat 0.2 m hkuc pcmhmmimhtut cyutli hgatyuctcup hwicli hrasljutnyik hpa7tli flatprikwisslip hpa7tmwatli fyfkr7t hjonli

drutta *Anemone nemorosa* is a PERENNIAL growing to 0.2 m (0ft 8in) by 0.3 m (1ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from March to May, and the seeds ripen from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

pcista All parts of this plant contain protoanemonin, an irritating acrid oil that is an enzymatic breakdown product of the glycoside ranunculin. While protoanemonin can cause severe topical and gastrointestinal irritation, it is unstable and changes into harmless anemonin when plants are dried or heated[4, 10, 19, 65, 270]. Can be a dangerous and powerful depressant of the central nervous system and heart [301]. Avoid during pregnancy.

dwatta Antirheumatic Homeopathy Rubefacient Tonic-The leaves are antirheumatic, rubefacient and tonic[7, 19, 46]. The plant is sometimes used externally as a counter-irritant in the treatment of rheumatism[7]. The herb is gathered in spring before the plant comes into flower[7]. Various parts of this herb used to be recommended for a variety of complaints such as headaches and gout, though the plant is virtually not used nowadays[4]. A homeopathic remedy has been made from the leaves[7].

fruit spurs are formed][200]. Garlic is a good companion for this plant, helping to prevent disease, especially peach leaf curl[20, 201]. Tansy grown below peach trees helps to keep them healthier[201]. Peach leaf curl can also be prevented by protecting the plants from winter and early spring rains, perhaps by covering them in plastic[200]. Plants grown or overwintered indoors do not suffer from leaf curl[260]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features: Edible. Not North American native. All or parts of this plant are poisonous. Attractive flowers or blooms. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is flat with shallow roots spreading near the soil surface. The root pattern is suckering with new plants from runners away from the plant [2-1].

6.2.10 *Prunus domestica italica*

Gages, Greengage

5 tin 8 cyuc 5 kcak 2 tcan 2 dwat 5 m hkuc hmimhtut cyutli tcup hwicli hrasljutnyikfrip hpa7tli flatprik-wisslip hpa7tmwatli hjonli

drutta *Prunus domestica italica* is a deciduous Tree growing to 5 m (16ft) by 4 m (13ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. The flowers are pollinated by Bees, Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: Flowers Fruit Oil SeedEdible Uses: OilFruit - raw or cooked. Often considered to be the finest of the dessert plums, they have a delicious flavour[K].The greengages. The usually green, globose fruit is usually 30 - 400mm in diameter. Seed - raw or cooked. Do not eat the seed if it is too bitter - see the notes above on toxicity. An edible gum is obtained from points of damage on the trunk[64]. The seed contains about 20% of an edible semi-drying oil[4 , 57]. It has an agreeable almond smell and flavour[4]. The flowers are eaten. They are used as a garnish for salads and ice cream or brewed into a tea[183].

tcanta Adhesive Cosmetic Dye Oil WoodA green dye can be obtained from the leaves [168]. A dark grey to green dye can be obtained from the fruit [168]. A yellow dye is obtained from the bark [115]. A gum obtained from points of damage along the stem can be used as an adhesive [64]. The ground up seeds are used cosmetically in the production of face-masks for dry skin [7]. A semi-drying oil is obtained from the seed [64]. No details of its uses. The reddish-brown

wood is very close-grained, hard, compact. Liable to warp and split. It is used for musical instruments [115 , 146].

dwatta Digestive Febrifuge Laxative Purgative Stomachic StypticThe dried fruit, known as prunes, is a safe and effective laxative and is also stomachic [4 , 7, 21, 238]. The bark is sometimes used as a febrifuge and is styptic [4 , 7]. An infusion of the flowers has been used as a mild purgative for children [4]. Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being [238].

nrakta A cultivated plant, not known in the wild. ksacta Not known in a truly wild situation

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe [200]. Sow stored seed in a cold frame as early in the year as possible [200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate [113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. The various cultivars of plum are unlikely to breed true (though the green forms of the gage generally do) - they will usually produce a range of plants from seed with differing characteristics from their parent. Cuttings of half-ripe wood with a heel, mid summer in a frame [11 , 200]. Softwood cuttings from strongly growing plants in spring to early summer in a frame [200]. Layering in spring.

nwatta The greengages are a group of cultivars of the common European plum. Gages are often cultivated as a fruit crop, especially in western Europe. Of excellent quality, though their delicate skins makes it difficult to get them to market in good condition and so they are more likely to be grown on a garden scale or be used for canning etc. *Prunus domestica* subsp. *italica* requires a well-drained moisture retentive soil [1 , 11]. Succeeds in light shade but fruits better in a sunny position [11 , 200]. Thrives in a loamy soil, doing well on limestone [11]. Grows well in heavy clay soils. Prefers some chalk in the soil but apt to become chlorotic if too much is present [1]. The various gages are often cultivated for their edible fruits, especially on a garden scale. There are some named varieties [200]. The gage was first developed from the plum in the Middle East, later spreading via France into much of western Europe. Its cultivation has spread into most temperate regions, though it is often only grown on a small scale because of the difficulty of getting it to market in good condition. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged [238]. Plants in this genus are notably susceptible to honey fungus [200]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is flat with shallow roots spreading near the soil surface [2-1]. *Prunus domestica italica* is a deciduous shrub or a tree usually growing 2 - 6 metres tall, occasionally to 15 metres. We can infer from its cultivation that the species grows optimally in areas with cold winters and long warm summers as vernalisation is required for flowering. The species can tolerate frost, however, when this occurs after flowering the fruit quality is poor (Lim 2002). Widely grown cultivars include: Boddarts Reneklode (Germany), Bryanston (UK), Cambridge Gage (UK), Canerik (Turkey), Denniston's Superb (USA), Gojeh Sabz (Iran), Yasil Alca or G6y Alca (Azerbaijan), Golden Transparent (UK), Graf Athnans Reneklode (Germany), Green Vanilla (Mount Pelion, Greece), GroSe Grune Reneklode (Germany) / Reine Claude Verte (France), Laxton's Gage (UK), Laxton's Supreme (UK), Meroldts Reneklode (Germany), Rainha Cláudia (Portugal), Regina Claudia (Italy), Reine Claude de Bavay (France), Reine Claude d'Oullins (France), Uhinks Reneklode (Germany), Washington (USA).

6.2.11 *Rubus fruticosus*

Blackberry, Shrubby blackberry
5 tin 9 cyuc 5 kcak 2 tcan 3 dwat 3 m hkuc

of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. This species has an excellent potential as a fruit crop in Britain. The fruit is about the size of a cherry, it is very freely borne and the best forms are of excellent dessert quality[K]. The tree is very easily grown and is little troubled by pests or diseases. It also requires very little attention, once the trees are established virtually the only work needed is to harvest the fruit each year[K]. Grafted specimens can produce fruit in their third year[K]. A very ornamental plant[74], it grows well in Britain flowering and fruiting well at Kew and Wisley[K]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Hybridizes freely with other members of this genus[200]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

6.2.9 Prunus persica

Peach, Flowering Peach, Ornamental Peach, Common Peach 5 tlin 9 cyuc 5 kcaak 3 tcan 3 dwat 6 m hkuc htut cyutili tcup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli fyfjxre7t hjonli

drutta Prunus persica is a deciduous Tree growing to 6 m (19ft) by 6 m (19ft) at a fast rate. See above for USDA hardness. It is hardy to UK zone 5 and is not frost tender. It is in flower in April, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista The seed can contain high levels of hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is readily detected by its bitter taste. Usually present in too small a quantity to do any harm, any very bitter seed or fruit should not be eaten[65]. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcaakta Edible Parts: Flowers Fruit Oil Oil SeedEdible Uses: Gum Oil Oil TeaFruit - raw, cooked or dried for later use[1, 2, 34, 46]. The fruit is often used in ice creams, pies, jams etc[183]. When fully ripe, the fruit of the best forms are very juicy with a rich delicious flavour[K]. Wild trees in the Himalayas yield about 36.5kg of fruit a year[194]. The fruit of the wild form contains about 5.2% sugars, 2% protein, 1.6% ash. Vitamin C content is 2.3mg per 100g[194]. The fruit is a good source of vitamin A[201]. Fruits of the wild peach are richer in nutrients than the cultivated forms[194]. The size of fruit varies widely between cultivars and the wild form, it can be up to 7cm in diameter and contains one seed[200]. Flowers - raw or cooked. Added to salads or used as a garnish[183]. They can also be brewed into a tea[183]. The distilled flowers yield a white liquid which can be used to impart a flavour resembling the seed[183]. Seed - raw or cooked. Do not eat if it is too bitter, seed can contain high concentrations of hydrocyanic acid. See the notes above on toxicity. A semi-drying oil is obtained from the seed[57]. Although the report does not mention edibility it can be assumed that it is edible. The seed contains up to 45% oil[218]. A gum is obtained from the stem. It can be used for chewing[64].

tcanta Adhesive Cleanser Dye Gum Oil OilA green dye can be obtained from the leaves[168]. Yellow according to another report[257]. A dark grey to green dye can be obtained from the fruit[168]. A semi-drying oil is obtained from the seed[57]. It is used as a substitute for almond oil in skin creams[238]. The bruised leaves, when rubbed within any container, will remove strong odours such as garlic or cloves so long as any grease has first been fully cleaned off[4]. A gum obtained from the stem is used as an adhesive[64].

dwatta Alternative Anthelmintic Antiasthmatic Antihalitosis Antitussive Astringent Demulcent Diuretic Emollient Expectoant Febrifuge Haemolytic Laxative Sedative Vitamin C Antihalitosis[194]. The leaves are astringent, demulcent,

diuretic, expectoant, febrifuge, laxative, parasiticide and mildly sedative[21, 218]. They are used internally in the treatment of gastritis, whooping cough, coughs and bronchitis[238]. They also help to relieve vomiting and morning sickness during pregnancy, though the dose must be carefully monitored because of their diuretic action[21]. The dried and powdered leaves have sometimes been used to help heal sores and wounds[21]. The leaves are harvested in June and July then dried for later use[4]. The flowers are diuretic, sedative and vermifuge[4, 21, 176, 194, 218]. They are used internally in the treatment of constipation and oedema[238]. A gum from the stems is alterative, astringent, demulcent and sedative[4, 21, 176, 194, 218]. The seed is antiasthmatic, antitussive, emollient, haemolytic, laxative and sedative[4, 21, 176, 194, 218]. It is used internally in the treatment of constipation in the elderly, coughs, asthma and menstrual disorders[238]. The bark is demulcent, diuretic, expectoant and sedative[4]. It is used internally in the treatment of gastritis, whooping cough, coughs and bronchitis[238]. The root bark is used in the treatment of dropsy and jaundice[183]. The bark is harvested from young trees in the spring and is dried for later use[4]. The seed contains 'laetirile', a substance that has also been called vitamin B17[218]. This has been claimed to have a positive effect in the treatment of cancer, but there does not at present seem to be much evidence to support this[K]. The pure substance is almost harmless, but on hydrolysis it yields hydrocyanic acid, a very rapidly acting poison - it should thus be treated with caution[218]. In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta E. Asia - China. ksacta Not known in a truly wild situation, it is possibly derived in cultivation from *P. davidiana*.

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. The stored seed is best given 2 months warm followed by 3 months cold stratification[113]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200]. A very low percentage[113]. Softwood cuttings from strongly growing plants in spring to early summer in a frame[200]. Layering in spring.

nwatta Landscape Uses:Container, Espalier, Firewood. Requires a well-drained moisture retentive soil[1, 11]. Thrives in a loamy soil, doing well on limestone[11]. Best not grown in acid soils. Prefers some chalk in the soil but it is apt to become chlorotic if too much is present[1]. Prefers a pH in the range 6 to 7[200]. Succeeds in light shade but fruits better in a sunny position[11]. Requires shelter from north and north-east winds[11] and also from spring frosts[200]. Widely cultivated for its edible fruit in warm temperate areas and continental climates, there are many named varieties[183]. There are numerous divisions of the varieties according to skin colour etc. Perhaps the most useful from the eaters point of view is whether it is free-stone (the flesh parts easily from the seed) or cling-stone (the flesh adheres to the seed)[200, K]. Trees are normally hardy in southern Britain[11], tolerating temperatures down to about -20°C when they are dormant[184], but they require some protection if cropping is to be at all reliable[11]. This is not due so much to lack of cold hardness, more to the cooler summers in Britain which do not fully ripen the wood and the fruit, plus the unpredictable winters and springs which, in a mild spell, can excite the tree into premature flowering and growth which is then very liable to damage in any following cold spell. Hand pollination at this time can improve fruit-set[200]. The cultivar 'Rochester' is more likely than most cultivars to succeed outdoors in Britain[200]. In general it is best to site peaches in a very warm sheltered sunny position, preferably against a south or west facing wall[200, 219]. Most cultivars are self-fertile[200]. Trees are often grafted onto plum or other rootstocks but are said to be better when grown on their own roots in southern Britain[11]. Trees are not generally long-lived[200], this is partly because of the need for the tree to produce a constant supply of new wood since most fruit is formed on one-year old wood (though some

nrakta Throughout the northern temperate zone of C. Europe, including Britain, and W. Asia. ksacta Woodland and shady hillsides in all but the most base deficient or water-logged soils[7, 17, 90].

propta Seed - best sown in a cold frame as soon as it is ripe in the summer[1]. Surface sow or only just cover the seed and keep the soil moist. Sow stored seed as soon as possible in late winter or early spring. The seed usually germinates in 1 - 6 months at 15°C[133]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for at least their first year. When the plants are large enough, plant them out in the spring. Division in late summer after the plant dies down.

nwatta Prefers a moist soil[1, 90, 200] but tolerates dry conditions during its summer dormancy[200]. Plants tolerate dry conditions and drought so long as there is plenty of humus in the soil[190]. Prefers a well-drained humus-rich soil[200]. Dislikes very acid soils[13]. Prefers a shady position, growing well on woodland edges[24, 90], but plants can also be naturalized in thin turf[200]. Plants seem to be immune to the predations of rabbits[233]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54]. The plant has a running rootstock and can spread rapidly when well-sited[4]. A very ornamental plant[1], there are several named varieties[190].

5.2.752 Bergenia purpurascens

4 tlin 8 cyuc 0 kcaak 0 tcan 2 dwat 0.5 m hkuc hmimhtut cyutili tcup hwicli hrasljutnyikfrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Bergenia purpurascens is an evergreen Perennial growing to 0.5 m (1ft 8in) by 0.3 m (1ft). See above for USDA hardness. It is hardy to UK zone 4 and is not frost tender. It is in leaf all year, in flower from March to May. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

tcanta A useful ground cover plant, though rather slow to spread[197]. Plants form clumps[208].

dwatta Antiseptic Astringent Styptic TonicThe root is astringent, styptic, tonic[61, 91, 218]. A safe and effective treatment for chronic bronchitis[218]. It is also used in the treatment of giddiness and general physical feebleness[61, 91]. Extracts of the plant are antiseptic[218]. The plant is a source of the drug berberin[266].

nrakta E. Asia - Himalayas to China. ksacta On rocks and open slopes, 3600 - 4700 metres. in the Himalayas[51]. Forests, scrub, alpine meadows and alpine rock crevices at elevations of 2700 - 4800 metres in western China[266].

propta Seed - surface sow in a greenhouse. Make sure that the compost does not dry out. Two weeks cold stratification can speed up germination which usually takes 1 - 6 months at 15°C[134]. Fresh seed, sown as soon as it is ripe in late spring is liable to germinate better than stored seed. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in late spring after flowering[188] or in autumn[200]. Very easy, larger divisions can be planted straight into their permanent positions whilst smaller clumps are best potted up and kept in a cold frame until they are growing away well.

nwatta Succeeds in full sun or light shade in most soils[134, 200] but prefers a deep fertile soil that does not dry out fully[134]. Grows well in heavy clay soils. Plants are at their best in a medium-heavy soil[208]. Requires a position sheltered from cold drying winds and from the early morning sun. The leaf colour is best when plants are grown in a poor soil in a sunny position[188]. Plants are hardy to about -20°C[187]. The young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. Plants seem to be immune to the predations of rabbits[233]. The different species of this genus will hybridise freely when grown near each other[233].

5.2.753 Narcissus poeticus

Poet's Narcissus 4 tlin 8 cyuc 0 kcaak 0 tcan 1 dwat 0.3 m hkuc htut cyutili tcup hwicli hrasljutnyikfrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Narcissus poeticus is a BULB growing to 0.3 m (1ft) by 0.1 m (0ft 4in). See above for USDA hardness. It is hardy to UK zone 4 and is not frost tender. It is in flower from April to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista All parts of the plant, and especially the bulb, are poisonous[4]. The aroma of the flowers can cause some people to get a headache when they are in a closed room[4].

tcanta EssentialAn essential oil is obtained from the flowers. 500kg of the flowers yields 1kg concrete, 300gr absolute of the essential oil[46, 61].

dwatta Emetic Homeopathy IrritantThe bulb is powerfully emetic and irritant[4]. A homeopathic remedy is made from the bulb[4].

nrakta Europe - France to Greece. ksacta Damp meadows[90] in mountains[50].

propta Seed - best sown as soon as it is ripe in a cold frame. A short stratification will improve the germination of stored seed. Sow the seed thinly so that the seedlings can be left undisturbed in the pot for their first two years of growth. Give them an occasional liquid feed in the growing season to ensure they do not become nutrient deficient. When the plants become dormant in the summer, pot up the small bulbs placing 2 - 3 bulbs in each pot. Grow them on for another one or two years in the greenhouse before planting them out when they are dormant in late summer. Division of bulbs after the leaves die down in early summer[1]. Larger bulbs can be replanted immediately into their permanent positions, or can be stored in a cool place and then be planted out in the autumn. It is best to pot up the smaller bulbs and grow them on for a year before planting them out when dormant in the autumn.

nwatta Prefers a deep rather stiff soil but succeeds in most soils and situations[1]. Grows well in heavy clay soils. Easily grown in a moist soil, doing well in grass[90] but it is slow to establish[188]. The dormant bulbs are fairly hardy and will withstand soil temperatures down to at least -5°C[214]. A very ornamental plant[1], but it is sometimes shy to flower[90]. The flowers are powerfully scented[245].

5.2.754 Eupatorium hyssopifolium

Hyssopleaf thoroughwort 4 tlin 8 cyuc 0 kcaak 0 tcan 1 dwat 0.6 m hkuc hmimhtut cyutili tcup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli fyfjxre7t hjonli

drutta Eupatorium hyssopifolium is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardness. It is hardy to UK zone 5. It is in flower from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

tcanta The plant is used as a stewing herb and to discourage insects[61].

dwatta StingsThe entire plant is applied externally as a remedy for the bites of reptiles and insects[207].

nrakta Central and Eastern N. America - Massachusetts to Florida and Texas. ksacta Dry fields[235].

propta Seed - sow spring in a cold frame and only just cover the seed. Prick out the seedlings into individual pots when they are large enough to handle and plant them out into their permanent positions in the summer. Division in spring or autumn[111]. Very easy, the clumps can be replanted direct into their permanent positions.

nwatta Succeeds in ordinary well-drained but moisture retentive garden soil in sun or part shade[200]. Plants seem to be immune to the predations of rabbits[233].

5.2.755 *Narcissus pseudonarcissus*

Wild Daffodil, Daffodil

4 tin 8 cyuc 0 kcaak 0 tcan 2 dwat 0.5 m hkuc hmimhtut cyuti tcup hwicli hrasjlutnykfrip hpa7tli flatprikliw hpa7tmwatli xre7t hjonli

drutta *Narcissus pseudonarcissus* is a BULB growing to 0.5 m (1ft 8in) by 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from March to April. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All parts of the plant are poisonous[4, 10, 76], the toxins being found mainly in the bulb[65], but even the flowers are mildly toxic[4]. An extract of the bulb, when applied to open wounds, has caused staggering, numbness of the whole nervous system and paralysis of the heart[4].

tcanta DyeA yellow to gold dye is obtained from the flowers[168].

dwatta Astringent Dysentery Emetic EpilepsyThe bulbs, leaves and flowers are astringent and powerfully emetic[4]. The bulb, especially, is narcotic and depresses the nervous system[4]. It has been used in the treatment of hysterical affections and even epilepsy with some effect[4]. The bulb is harvested in the winter and dried for later use[4]. The flowers are harvested in dry weather when they are fully open and should be dried quickly[4]. They are less powerful than the bulbs but are also considered to be antispasmodic and are useful in relieving the congestive bronchial catarrh of children and also useful in cases of epidemic dysentery[4].

nrakta Western Europe, including Britain. ksacta Moist woodlands and grassland[17].

propta Seed - best sown as soon as it is ripe in a cold frame. A short stratification will improve the germination of stored seed. Sow the seed thinly so that the seedlings can be left undisturbed in the pot for their first two years of growth. Give them an occasional liquid feed in the growing season to ensure they do not become nutrient deficient. When the plants become dormant in the summer, pot up the small bulbs placing 2 - 3 bulbs in each pot. Grow them on for another one or two years in the greenhouse before planting them out when they are dormant in late summer. Division of bulbs after the leaves die down in early summer[1]. Larger bulbs can be replanted immediately into their permanent positions, or can be stored in a cool place and then be planted out in the autumn. It is best to pot up the smaller bulbs and grow them on for a year before planting them out when dormant in the autumn.

nwatta Prefers a deep rather stiff soil but succeeds in most soils[1]. Grows well in heavy clay soils. Succeeds in sun or shade[31]. Grows well on woodland edges[24]. The flowers have the sweet woodland perfume of the primrose[245]. This is not very discernible when only a few plants are grown, but is quite noticeable in a group of plants[245].

5.2.756 *Scutellaria galericulata*

Common Skullcap, Marsh skullcap

4 tin 8 cyuc 0 kcaak 0 tcan 3 dwat 0.5 m hkuc htut cyuti tcup hwicli hrasjlutnyk hpa7tli flatprikliw hpa7tmwatli xre7t hjonli

drutta *Scutellaria galericulata* is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to September, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

dwatta Antiinflammatory Antispasmodic Astringent Epilepsy Febrifuge Nerve TonicThe herb is anti-inflammatory, antispasmodic, slightly astringent, febrifuge, nerve and strongly tonic[4, 9, 165]. In the home an infusion is sometimes used in the treatment of throat infections[9]. The plant is harvested in the summer as it comes into flower and can be dried for later use[9]. This plant is rarely if ever

used in herbal medicine[9], though it is said to have the same applications as *S. lateriflora*[238]. These applications are:- Skullcap was traditionally used in the treatment of a wide range of nervous conditions including epilepsy, insomnia, anxiety, delirium tremens, withdrawal from barbiturates and tranquilisers, and neuralgia[222, 238]. An infusion of the plant has been used to promote suppressed menstruation[213], it should not be given to pregnant women since it can induce a miscarriage[238]. This plant should be used with some caution since in excess it causes giddiness, stupor, confusion and twitching[238].

nrakta Europe, including Britain, south and east from Scandinavia to Spain, north and west Asia. ksacta Moist acid or calcareous soils on the edges of streams, in water meadows and fens, ascending to 360 metres in Britain[4, 17].

propta Seed - sow in situ outdoors in late spring. If there is only a small quantity of seed it is better to sow it in a pot in a cold frame in early spring. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the spring. Division in spring just before new growth begins. Very easy, larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer. Basal cuttings in early summer in a frame. Very easy. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Succeeds in a sunny position in any ordinary garden soil that does not dry out during the growing season[200].

5.2.757 *Hyacinthoides nonscripta*

Bluebell

4 tin 8 cyuc 0 kcaak 0 tcan 1 dwat 0.3 m hkuc hmimhtut cyuti kyuctup hwicli hrasjlutnykfrip hpa7tli flatprikliw hpa7tmwatli xre7t hjonli

drutta *Hyacinthoides nonscripta* is a BULB growing to 0.3 m (1ft) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to June, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies, beetles. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista The bulb (and the whole plant?) is poisonous[4]. tcanta Adhesive StarchA glue is obtained from the sap in the bulb and stem[4, 6, 66]. Simply cut open a bulb and apply the sap to whatever needs to be joined[K]. It makes an excellent paper glue, the join is stronger than the surrounding paper[6]. It would not work on non-absorbent materials such as plastics and glass[K]. A starch from the bulb has been used in laundering[4], it is very harsh on the skin[6].

dwatta Diuretic StypticThe bulb has diuretic and styptic properties[4]. It is used as a remedy for leucorrhoea[4].

nrakta Western Europe from the Netherlands and Britain o Belgium and France. ksacta Deciduous woodland[28], usually on slightly acid soils[17].

propta Seed - sow early spring or as soon as ripe in a cold frame. It usually requires stratification. If you have plenty of seed it can be sown in situ, but it is usually more economical to sow it in a frame. If sown thinly, the seedlings can be left in their pots for the first year, though give them regular liquid feeds to make sure that they get sufficient nutrient. Prick out the seedlings about 3 to a pot and grow on for 1 - 2 more years before planting out into their permanent positions when they are dormant[K]. Division of the bulbs in summer after the leaves die down. Larger bulbs can be replanted direct into their permanent positions, but it is best to pot up smaller bulbs and grow them on for a year in a cold frame before planting them out when dormant in late summer.

nwatta Easily grown in a soil rich in leafmold[90], preferring semi-shade[28, 31] but tolerating full sun. Succeeds in most soils but prefers a heavy one[200]. Succeeds in the dry shade of trees[188, 233]. Bulbs like to be quite deep in

6.2.7 *Crataegus ellwangeriana*

Scarlet Hawthorn

5 tin 7 cyuc 5 kcaak 2 tcan 2 dwat 6 m hkuc hmimhtut cyuti hgattcuphja7n hwicli hrasjlutnykfrip hpa7tli flatprikliwslip hpa7tmwatli xre7t hjonli

drutta *Crataegus ellwangeriana* is a deciduous Tree growing to 6 m (19ft) by 6 m (19ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. Juicy and acid[82]. An excellent dessert fruit, it has an acid yet sweet flavour, is juicy but with a mealy texture, it makes very pleasant eating[K]. The fruit can also be used in making pies, preserves etc, and can be dried for later use. A reasonable size, it is about 15mm in diameter[200]. A specimen at Kew has fruits up to 25mm in diameter[K]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta Eastern N. America. ksacta Not known in the wild, it is possibly of hybrid origin.

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. This species is possibly of hybrid origin, involving *C. pedicellata*, though some botanists view it as no more than part of *C. pedicellata*[82]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like de-

caying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. A very ornamental plant[11].

6.2.8 *Crataegus schraderana*

Blue hawthorn

5 tin 9 cyuc 5 kcaak 0 tcan 2 dwat 6 m hkuc hmimhtut cyuti hgattcuphja7n hwicli hrasjlutnykfrip hpa7tli flatprikliwslip hpa7tmwatli xre7t hjonli

drutta *Crataegus schraderana* is a deciduous Tree growing to 6 m (19ft 8in). It is not frost tender. It is in flower in June, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Fruit - raw or cooked[74]. A reasonable size, about 15 - 20mm in diameter[K]. This is one of the nicest tasting fruits of the genus I have tried to date. When fully ripe it is juicy with an extremely pleasant flavour and almost literally melts in the mouth[K]. I would far rather eat this fruit than a strawberry[K]. It ripens in late September and hangs on the tree in good condition for at least 4 weeks[K]. The ripe fruit is so soft that it is best eaten fresh from the tree[K]. The fruit can also be used in making pies, preserves etc, and can be dried for later use. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Although no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta S. Europe - Greece. ksacta Mountainous areas[50].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177]. Sub-acid[82]. A delicious flavour, it is sweet with a soft juicy flesh and makes an excellent dessert fruit[K]. It can also be cooked and used in pies, preserves etc and can be dried for later use. The fruit ripens in early September in southern Britain[K]. The fruit is about 2cm in diameter[K]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotoxic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta North-eastern N. America - Massachusetts and Connecticut. ksacta Wooded banks[43]. Thickets on a dry bank[82].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. This is a tree with an excellent potential as a fruit crop in Britain. The fruit is of very good quality and is freely borne, whilst the tree is of very easy cultivation and rarely troubled by pests or diseases[K]. A tree at the Hillier Arboretum in September 1993 was about 3 metres tall and 1.5 metres wide. The growth looked somewhat weak and the tree was leaning due to wind rock but it was carrying a heavy crop of fruit[K]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. A very ornamental plant[1], it is very closely related to *C. mollis*, and considered to be part of that species by many botanists[229]. Hybridizes freely with other members of this genus[200]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

6.2.6 Prunus insititia

Damson
5 tin 9 cyuc 5 kcak 3 tcan 1 dwat 6 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Prunus insititia is a deciduous Tree growing to 6 m (19ft) by 5 m (16ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in April, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: FruitSeedEdible Uses: Fruit - raw or cooked[1, 2, 46]. More acid than a plum but it is very acceptable raw when fully ripe, especially after being touched by frost[12, 34, K]. The fruit is about 3cm in diameter and contains one large seed[200]. Seed - raw or cooked. Do not eat the seed if it is too bitter - see the notes above on toxicity.

tcanta Dye Hedge Hedge ShelterbeltA green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168]. Trees are fairly wind resistant and can be grown as a shelterbelt hedge[200].

dwatta Febrifuge Purgative StypticThe bark of the root and branches is febrifuge and considerably styptic[4]. An infusion of the flowers has been used as a mild purgative for children[4]. Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta S. W. Asia. Naturalized and often considered a native of Britain. ksacta Thickets, hedges and open woods[4, 17].

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200]. Softwood cuttings from strongly growing plants in spring to early summer in a frame[200]. Layering in spring.

nwatta Requires a well-drained moisture retentive soil[1, 11]. Succeeds in light shade but fruits better in a sunny position[11, 200]. Thrives in a loamy soil, doing well on limestone[11]. Grows well in heavy clay soils. Prefers some chalk in the soil but apt to become chlorotic if too much is present[1]. Occasionally cultivated for its edible fruit, there are some named varieties[200]. It has been derived in cultivation from the bullace, differing in having a sweeter fruit[200]. Damsons can be grown successfully against a north facing wall[219]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. Plants in this genus are notably susceptible to honey fungus[200]. Prunus insititia L. is a synonym of Prunus domestica subsp. insititia (L.) Bonnier and Layens For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A sprouting standard sending up shoots from the base [1-2].

the soil[200]. The flowers diffuse a balsam-like scent in the sunshine[245].

5.2.758 Anthemis arvensis

Corn Chamomile
4 tin 8 cyuc 0 kcak 2 tcan 2 dwat 0.4 m hkuc
htut cyutli kyuctup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli fyifxre7t hjonli

drutta Anthemis arvensis is a ANNUAL growing to 0.4 m (1ft 4in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to July, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies, beetles. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil.

tcanta Can be used as an ornamental plant.
dwatta FebrifugeThis species is considered to be one of the best febrifuge species indigenous to France[4]. The flowers and leaves are used[4].

nrakta Most of Europe, including Britain, south and east to N. Africa and W. Asia. ksacta A locally common calcicolous plant of arable land and waste places throughout Britain[17].
propta Seed - best sown outdoors as soon as it is ripe. Most of the seed germinates in the autumn.

nwatta Prefers a sunny position and a well-drained soil that is neutral to slightly acid[1, 200]. Succeeds in heavy clay soils.

5.2.759 Asperula cynanchica

Squinancy Wort
4 tin 8 cyuc 0 kcak 0 tcan 1 dwat 0.4 m hkuc
hmimhtut cyutli kyuctup hwicli hrasjlutnyik hpa7tli priklwisslip hpa7tmwatli xre7t hjonli

drutta Asperula cynanchica is a PERENNIAL growing to 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

tcanta DyeA red dye is obtained from the root[4].
dwatta The plant was at one time esteemed as a remedy for quinsy, but it is no longer used in herbal medicine[4].

nrakta Central and southeastern Europe, including Britain, to the Caucasus. ksacta Dry calcareous pastures and calcareous dunes[17].

propta Seed - sow spring to early summer in a light position in a cold frame[134]. 2 weeks pre-chilling improves the germination rate[134]. The seed usually germinates in 1 month at 10°C[134]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or early summer[200]. Basal cuttings of soft young shoots in early summer[200].

nwatta Succeeds in almost any soil, including dry ones[1]. Prefers a well-drained moisture retentive soil in sun or semi-shade[200].

5.2.760 Cirsium acaulon

Stemless Thistle
4 tin 8 cyuc 0 kcak 0 tcan 1 dwat 0.3 m hkuc
htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Cirsium acaulon is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies), beetles. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

tcanta The seed of all species of thistles yields a good oil by expression[4]. No details of potential yields etc are given[K].

dwatta OdontalgicAt one time the root used to be chewed as a remedy for toothache[4].

nrakta Europe, including Britain, from Scandinavia to Spain and east to W. Asia. ksacta Closely grazed pastures, especially on chalk or limestone[17].

propta Seed - sow early spring or autumn in situ. Germination usually takes place within 2 - 8 weeks at 20°C.

nwatta An easily grown plant, succeeding in any ordinary garden soil in a sunny position[200]. This plant is very injurious in grassland, killing all plants that grow below it[4].

5.2.761 Anemone virginiana

Tall Thimbleweed
4 tin 8 cyuc 0 kcak 0 tcan 1 dwat 0.6 m hkuc
pcimhmm cyutli htattcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Anemone virginiana is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil and can tolerate drought.

pcista Although no specific mention has been seen for this species, many members of this genus contain protoanemonin, an irritating acrid oil that is an enzymatic breakdown product of the glycoside ranunculin. While protoanemonin can cause severe topical and gastrointestinal irritation, it is unstable and changes into harmless anemonin when plants are dried or heated[4, 10, 19, 65, 270].

dwatta Astringent Emetic ExpectorantPoulticeThe root and seeds are astringent, emetic and expectorant[222]. A decoction of the roots was used in the treatment of TB, whooping cough and diarrhoea[222, 257]. The root is pulverised and used as a wet poultice in the treatment of boils[213, 222, 257].

nrakta Central and Eastern N. America - Nova Scotia to South Carolina, Kansas, Alberta and Arkansas. ksacta Dry open woods[222]. Dry, rocky, open woods, thickets and river banks from sea level to 2000 metres[270].

propta Seed - best sown in a cold frame as soon as it is ripe in the summer[1]. Surface sow or only just cover the seed and keep the soil moist. Sow stored seed as soon as possible in late winter or early spring. The seed usually germinates in 1 - 6 months at 20°C[133]. When large enough to handle, prick the seedlings out into individual pots and grow them on for at least their first year in a lightly shaded place in a greenhouse. When large enough, plant them out into their permanent positions in the spring. Division in late summer after the plant dies down.

nwatta Succeeds in ordinary garden soil but prefers a moist well-drained woodland soil[1, 200]. Prefers a moist peaty soil in some shade[187]. Tolerates drought during its summer dormancy[200]. Plants seem to be immune to the predations of rabbits[233]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

5.2.762 Gentiana decumbens

4 tin 8 cyuc 0 kcak 0 tcan 1 dwat 0.3 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Gentiana decumbens is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bumblebees, butterflies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

dwatta StomachicA tincture of the plant is used as a stomachic[240].

nrakta E. Asia - Himalayas to Siberia. ksacta Alpine slopes, 3300 - 4500 metres[240]. Along streams, grassland slopes, clearings in forests, dry steppes at elevations of 1,200 - 2,700 metres in northern China[266].

propta Seed - best sown as soon as it is ripe in a light position in a cold frame[200]. It can also be sown in late winter or early spring but the seed germinates best if given a period of cold stratification and quickly loses viability when stored, with older seed germinating slowly and erratically[200, 239]. It is advantageous to keep the seed at about 10°C for a few days after sowing, to enable the seed to imbibe moisture[239]. Following this with a period of at least 5 - 6 weeks with temperatures falling to between 0 and -5°C will usually produce reasonable germination[239]. It is best to use clay pots, since plastic ones do not drain so freely and the moister conditions encourage the growth of moss, which will prevent germination of the seed[239]. The seed should be surface-sown, or only covered with a very light dressing of compost. The seed requires dark for germination, so the pots should be covered with something like newspaper or be kept in the dark[239]. Pot up the seedlings into individual pots as soon as they are large enough to handle and grow on in light shade in the greenhouse for at least their first winter. The seedlings grow on very slowly, taking 2 - 7 years to reach flowering size[239]. When the plants are of sufficient size, place them out into their permanent positions in late spring or early summer. Division in March[111]. Most members of this genus have either a single tap-root, or a compact root system united in a single root head, and are thus unsuitable for division[239]. Cuttings of basal shoots in late spring[238].

nwatta In general, gentians require a moist well-drained soil in a sheltered position, a certain minimum of atmospheric humidity, high light intensity but a site where temperatures are not too high[239]. They are therefore more difficult to grow in areas with hot summers and in such a region they appreciate some protection from the strongest sunlight[200, 239]. Most species will grow well in the rock garden[200]. Plants are intolerant of root disturbance[200].

5.2.763 Gentiana dahurica

4 tlin 8 cyuc 0 kcak 0 tcan 3 dwat 0.3 m hkuc hmimhtut cyutli tucp hwicli hrasjlutnykic hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Gentiana dahurica* is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bumblebees, butterflies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

dwatta Analgesic Antiinflammatory Antipyretic Antirheumatic Diuretic HypotensiveThe roots of gentian species contain some of the most bitter compounds known and make an excellent tonic for the whole digestive system, working especially on the stomach, liver and gall bladder[238]. The root is analgesic, anti-inflammatory, antipyretic, antirheumatic, diuretic, febrifuge, hypoglycaemic and antispasmodic[176, 218, 238]. The root is used internally in the treatment of arthritis, allergic inflammations, low-grade fever in chronic diseases, jaundice and hepatitis[176, 218, 238]. The root is harvested in the autumn and dried for later use.

nrakta W. Asia to E. Asia - China. ksacta Grassy slopes[74]. Roadsides, stream banks, sandy places around lakes, sunny slopes, dry steppes and the edges of cultivated land at elevations of 800 - 4500 metres[266].

propta Seed - best sown as soon as it is ripe in a light position in a cold frame[200]. It can also be sown in late winter or early spring but the seed germinates best if given a period of cold stratification and quickly loses viability when stored, with older seed germinating slowly and erratically[200, 239]. It is advantageous to keep the seed at about 10°C for a few days after sowing, to enable the seed to imbibe moisture[239]. Following this with a period of at least 5 - 6 weeks with temperatures falling to between 0 and -5°C will usually produce reasonable germination[239]. It is best to use clay pots, since plastic ones do not drain so freely and the moister conditions encourage the growth of moss, which will

prevent germination of the seed[239]. The seed should be surface-sown, or only covered with a very light dressing of compost. The seed requires dark for germination, so the pots should be covered with something like newspaper or be kept in the dark[239]. Pot up the seedlings into individual pots as soon as they are large enough to handle and grow on in light shade in the greenhouse for at least their first winter. The seedlings grow on very slowly, taking 2 - 7 years to reach flowering size[239]. When the plants are of sufficient size, place them out into their permanent positions in late spring or early summer. Division in March[111]. Most members of this genus have either a single tap-root, or a compact root system united in a single root head, and are thus unsuitable for division[239]. Cuttings of basal shoots in late spring[238].

nwatta In general, gentians require a moist well-drained soil in a sheltered position, a certain minimum of atmospheric humidity, high light intensity but a site where temperatures are not too high[239]. They are therefore more difficult to grow in areas with hot summers and in such a region they appreciate some protection from the strongest sunlight[200, 239]. Most species will grow well in the rock garden[200]. This species prefers an alkaline soil, but can succeed in neutral to slightly acid conditions[239]. A moisture loving plant, preferring to grow with full exposure to the sun but with plenty of underground moisture in the summer, it grows better in the north and west of Britain[1]. Many of the plants and seeds offered under this name are wrongly identified, usually being *G. gracilipes*, *G. cruciata* or *G. decumbens*[239]. Plants are intolerant of root disturbance[200].

5.2.764 Apocynum androsaemifolium

Spreading Dogbane

4 tlin 8 cyuc 0 kcak 1 tcan 2 dwat 0.6 m hkuc pcmhmmihtut cyutli kyuctcup hwicli hrasjlutnykic hpa7tli frusflatprikliwis hpa7tmwatli xre7t hjonli

drutta *Apocynum androsaemifolium* is a PERENNIAL growing to 0.6 m (2ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in July. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista All parts of the plant are poisonous[1, 62]. tcanta Fibre LaTeXThe bark yields a good quality fibre that is used for making twine, bags, linen etc[4, 99, 155, 257]. It is inferior to *A. cannabinum*[99]. The fibre is finer and stronger than cotton[207]. It can be harvested after the leaves fall in the autumn but is probably at its best as the seed pods are forming[169]. The plant yields a latex, which is a possible source of rubber[46, 61]. It is obtained by making incisions on the stem and resembles indiarubber when dry[4].

dwatta Cardiotonic Cathartic Contraceptive Diaphoretic Diuretic Emetic Expectorant Urinary VDSpreading dogbane is an unpleasantly bitter stimulant irritant herb that acts on the heart, respiratory and urinary systems, and also on the uterus[238]. It was widely employed by the native North American Indians who used it to treat a wide variety of complaints including headaches, convulsions, earache, heart palpitations, colds, insanity and dizziness[257]. It should be used with great caution, and only under the supervision of a qualified practitioner if taking this plant internally[21, 238]. The root contains cymarin, a cardioactive glycoside that is toxic to ruminants[222]. The root is cardiotonic, cathartic, diaphoretic, diuretic, emetic and expectorant[1, 4, 21, 61, 222]. It has a powerful action in slowing the pulse and also has a very strong action on the vaso-motor system, it is rather an irritant to the mucous membranes though, so some people cannot tolerate it[4]. The juice of the fresh root has been used in the treatment of syphilis[207]. The sap of the plant has been applied externally to get rid of warts[257]. The roots were boiled in water and the water drunk once a week in order to prevent conception[213]. The green fruits were boiled and the decoction used in the treatment of heart and kidney problems and for the treatment of dropsy[213]. This

slopes, by streams and roadsides, in mixed, sparse, and dense woods at elevations of 400 - 2200 metres[266].

propta Seed - best sown as soon as it is ripe in a cold frame or in an outdoors seedbed if there is sufficient seed[80, 113]. The seed must be separated from the fruit flesh since this contains germination inhibitors[80, 164]. Stored seed should be cold stratified for 3 - 4 months and sown as early as possible in the year[164]. Scarification may also help as may a period of warm stratification before the cold stratification[80, 164]. Germination, especially of stored seed, can be very slow, taking 18 months or more[164]. Prick out the seedlings of cold-frame sown seeds into individual pots as soon as they are large enough to handle and grow the plants on for their first winter in a greenhouse, planting out in the spring after the last expected frosts. Cuttings of half-ripe side shoots, July/August in a frame[188]. Cuttings of mature wood of the current year's growth, taken with a heel if possible, autumn in a cold frame. High percentage[78]. Layering of new growth in June/July. Takes 9 months[78].

nwatta Landscape Uses:Pest tolerant, Specimen, Woodland garden. An easily grown plant, it succeeds in any soil of good or moderate fertility, from acid to slightly alkaline but dislikes shallow chalky soils[184, 188]. Grows well in heavy clay soils. Prefers a rich well-drained loamy soil and a position that is at least partially sunny[11]. A very ornamental plant[1], it is hardy to about -20°C[184]. A number of named forms have been developed for their ornamental value[182]. Plants are slow-growing when young, they speed up somewhat after a few years but then soon slow down again[202]. The sub-species of *C. kousa chinensis* grows more freely, flowering and fruiting better in Britain though it barely differs in appearance from the species[11]. This species has been known to hybridize with *C. capitata*[182]. The cultivar 'Norman Hadden' could be such a hybrid[182]. Plants in this genus are notably resistant to honey fungus[200]. Special Features:Attracts birds, Not North American native, Blooms are very showy. The plant is heat tolerant in zones 8 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2].

6.2.4 Crataegus pennsylvanica

5 tlin 9 cyuc 5 kcak 0 tcan 2 dwat 9 m hkuc hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnykifrip hpa7tli flatprikliwssilip hpa7tmwatli xre7t hjonli

drutta *Crataegus pennsylvanica* is a deciduous Tree growing to 9 m (29ft 6in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

ckakta Fruit - raw or cooked. A very good size fruit, up to 25mm in diameter, with a lovely semi-sweet flavour even when semi-ripe, it makes a delicious dessert[K]. It is also sometimes made into jellies[82] and can be dried for later use. The fruit is borne in clusters of 4- 12 and is very easily harvested[82, K]. There are up to five fairly large seeds in the centre of each fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Although no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta Eastern N. America - Delaware to Pennsylvania and W. Virginia. ksacta Open woods and thickets in moist fertile soils[43]. Meadows in low, moist soils[82].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. This species has a good potential as a fruit crop in Britain. It regularly produces heavy crops of high quality, the tree is very easily grown and is little troubled by pests or diseases. It also requires very little attention, once the trees are established virtually the only work needed is to harvest the fruit each year[K]. A tree about 5 metres tall and wide at Kew fruits regularly and very heavily[K]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

6.2.5 Crataegus arnoldiana

Arnold Hawthorn

5 tlin 9 cyuc 5 kcak 0 tcan 2 dwat 7 m hkuc hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnykifrip hpa7tli flatprikliwssilip hpa7tmwatli xre7t hjonli

drutta *Crataegus arnoldiana* is a deciduous Tree growing to 7 m (23ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

the species[11]. Plants in this genus are notably resistant to honey fungus[200].

6.2.2 Morus nigra

Black Mulberry

5 tlin 9 cyuc 5 kcak 3 tcan 3 dwat 10 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyif hjonli

drutta Morus nigra is a deciduous Tree growing to 10 m (32ft) by 15 m (49ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to June, and the seeds ripen from August to September. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw, cooked or used in preserves[1, 2, 3, 4, 7, 9, 183]. A delicious slightly acid flavour, it makes an excellent dessert fruit and can be eaten in quantity[K]. The fruit is juicy and refreshing, though it must be used as soon as it is ripe (from mid-August to September) otherwise it will start to rot[200]. The fruit falls from the tree as soon as it is fully ripe. It is best, therefore, to grow the tree in short grass to cushion the fall of the fruit but to still make it possible to find and harvest[K]. The fruit can also be dried and ground into a powder[183]. The fruit is up to 25mm in diameter[200, 227]. White Mulberry (Morus alba) has edible young leaves and shoots eaten cooked[105, 183] but we have found no information for this plant.

tcanta Dye Fibre WoodA fibre used in weaving is obtained from the bark[7]. A red-violet to dark purple dye is obtained from the fruit[168]. A yellow-green dye is obtained from the leaves[168]. Wood - used in joinery[100].

dwatta Anthelmintic Astringent Homeopathy Hypoglycaemic Laxative Odontalgic Purgative UrinaryThe mulberry has a long history of medicinal use in Chinese medicine, almost all parts of the plant are used in one way or another[238]. The white mulberry (M. alba) is normally used, but this species has the same properties[238]. Recent research has shown improvements in elephantiasis when treated with leaf extract injections and in tetanus following oral doses of the sap mixed with sugar[238]. Analgesic, emollient, sedative[7, 176]. The leaves are antibacterial, astringent, diaphoretic, hypoglycaemic, odontalgic and ophthalmic[218, 238]. They are taken internally in the treatment of colds, influenza, eye infections and nosebleeds[238]. The leaves are collected after the first frosts of autumn and can be used fresh but are generally dried[238]. The stems are antirheumatic, diuretic, hypotensive and pectoral[218, 238]. A tincture of the bark is used to relieve toothache[7]. The branches are harvested in late spring or early summer and are dried for later use[238]. The fruit has a tonic effect on kidney energy[218, 238]. It is used in the treatment of urinary incontinence, tinnitus, premature greying of the hair and constipation in the elderly[238]. Its main use in herbal medicine is as a colouring and flavouring in other medicines[4]. The root bark is antitussive, diuretic, expectorant and hypotensive[238]. It is used internally in the treatment of asthma, coughs, bronchitis, oedema, hypertension and diabetes[238]. The roots are harvested in the winter and dried for later use[238]. The bark is anthelmintic and purgative, it is used to expel tape worms[4, 240]. Extracts of the plant have antibacterial and fungicidal activity[218]. A homeopathic remedy is made from the leaves[9]. It is used in the treatment of diabetes[9].

nrakta W. Asia? ksacta Original habitat is obscure.

propta The seed germinates best if given 2 - 3 months cold stratification[80, 98]. Sow the seed as soon as it is ripe if possible, otherwise in February in a cold frame. The seed usually germinates in the first spring, though it sometimes takes another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the cold frame for their first winter. Plant them out in late spring or early summer after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame. Plant out in spring. A good percentage take,

though they sometimes fail to thrive[78, 113]. Cuttings of mature wood of the current season's growth, 25 - 30cm with a heel of 2 year old wood, autumn or early spring in a cold frame or a shady bed outside[78, 113,200]. Bury the cuttings to threequarters of their depth. It is said that cuttings of older wood up to 2.5 metres long can be readily made to strike[4]. The cuttings are taken in February and planted 30cm deep in a shady sheltered position outdoors. The stem is wrapped in moss to prevent water loss by transpiration, with only the top few buds not being covered[4]. Layering in autumn[200].

nwatta Prefers a warm moist but well-drained loamy soil in a sheltered sunny position[1, 11]. Prefers a light soil[37]. Plants are very tolerant of atmospheric pollution[4]. Trees are hardy as far north as southern Sweden[4]. A slow growing[200] but very ornamental tree[1], the mulberry is sometimes cultivated in gardens for its delicious edible fruit[183]. The tree is not grown on a commercial scale because the fruit is too soft and easily damaged to allow it to be transported to market, and is therefore best eaten straight from the tree. There are some named varieties[183]. The mulberry takes many years to settle down and produce good crops of fruit, about 15 years being the norm[4]. Trees fruit well in southern and south-western Britain[59, 200] but they require the protection of a wall further north if the fruit is to ripen[200]. This is a good tree for growing grapes into[20]. It means that the grapes are difficult to pick, but they always seem to be healthier and free from fungal diseases[201]. Plants are late coming into leaf and also lose their leaves at the first autumn frosts though the tree in leaf casts quite a dense shade[200]. Mulberries have brittle roots and so need to be handled with care when planting them out[238]. Any pruning should only be carried out in the winter when the plant is fully dormant because mulberries bleed badly when cut[238]. Ideally prune only badly placed branches and dead wood[238]. Once considered to be a very long-lived tree, doubts are now being cast on this assumption, it is probably fairly short-lived[11]. Plants in this genus are notably resistant to honey fungus[200]. The plant is heat tolerant in zones 9 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2].

6.2.3 Cornus kousa

Japanese Dogwood, Kousa dogwood, Chinese Dogwood, 5 tlin 8 cyuc 5 kcak 2 tcan 0 dwat 10 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Cornus kousa is a deciduous Tree growing to 10 m (32ft) by 6 m (19ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in June, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit - raw or cooked[61, 177]. Sweet and juicy[11, 183], it is very nice in small quantities[K]. Very seedy[105]. The skin is rather tough and unpleasant, but the pulp is delicious with a custard-like texture, it is one of our favourite late summer fruits[K]. The fruit is about 2cm in diameter[200]. Young leaves - cooked[105, 177, 183].

tcanta WoodWood - very hard and heavy. Used for mallets etc[151].

nrakta E. Asia - China, Japan, Korea. ksacta Woods and scrub in the mountains of Sichuan[109]. Valleys, shaded

preparation can irritate the intestines and cause unpleasant side-effects[213].

nrakta Northern N. America. ksacta Open woodland, woodland edges etc, usually on drier soils[43, 62].

propta Seed - best sown as soon as it is ripe in late summer and overwintered outdoors. The seed requires a period of cold stratification if it is to germinate well[238]. Prick out the seedlings when large enough to handle and grow them on in a cold frame for their first winter, planting out in late spring of the following year[K]. Division in spring just before active growth begins[200]. Plants can also be divided in the autumn[238].

nwatta Prefers an acid peaty soil[1] but it succeeds in sun or shade in most well-drained soils and climates[169, 200]. A very ornamental plant[1], but it can be invasive[200]. The flowers the flowers secrete a sweet liquid that is very attractive to flies[4]. The flies are then imprisoned by their proboscis which becomes trapped between the short filaments of the stamens[207].

5.2.765 Peaonia caucasica

4 tlin 8 cyuc 0 kcak 0 tcan 1 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta Peaonia caucasica is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

tcanta Beads Dye OilA red dye is obtained from the flowers[74]. It has been used to dye cloth and paper[250]. A fatty oil is obtained from the seed[74, 250]. No uses of the oil are given[K]. The seeds are used as beads in necklaces etc[74, 250].

dwatta AntitussiveA tea made from the dried crushed petals of various peony species has been used as a cough remedy, and as a treatment for haemorrhoids and varicose veins[250].

nrakta W. Europe to W. Asia. ksacta Forests, forest margins, short grass meadows and shrub thickets in the forest zone[74].

propta Seed - best sown as soon as it is ripe in a cold frame[250]. When sown fresh, the seed produces a root about 6 weeks after sowing with shoots formed in the spring[200]. Stored seed is much slower, it should be sown as soon as possible in a cold frame but may take 18 months or more to germinate[200]. The roots are very sensitive to disturbance, so many growers allow the seedlings to remain in their pots for 2 growing seasons before potting them up. This allows a better root system to develop that is more resilient to disturbance[250]. If following this practice, make sure you sow the seed thinly, and give regular liquid feeds in the growing season to ensure the plants are well fed. We usually prick out the seedlings into individual pots as soon as they are large enough to handle, and then grow them on in a cold frame for at least two growing seasons before planting them out when they are in growth in the spring[K]. Division with great care in spring or autumn. Each portion must have a leaf bud. If the lifted root is stood in shade for several hours it becomes less brittle and easier to divide[200]. Divisions that have several buds will usually flower in the second year, but those that only have one or two buds will take a number of years before they have grown sufficiently to flower[250].

nwatta Requires a deep rich soil, preferably neutral or slightly alkaline[1], doing quite well in sun or light shade[1, 200]. Plants are tolerant of a wide range of soil conditions, but will not survive if the soil becomes waterlogged or is too dry[250]. This species is lime tolerant[200]. Plants grown on sandy soils tend to produce more leaves and less flowers, whilst those growing on clay take longer to become established but produce better blooms[250]. This species is not recognized by many botanists, who view it as no more than a synonym of *P. mascula*[250]. A long-lived plant, specimens can survive in the garden for at least 50 years[200]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. A very greedy plant inhibiting the growth

of nearby plants, especially legumes[54]. Strongly resents root disturbance, taking some time to recover after being divided[1]. Peony species are usually self-fertile, though they will also hybridise with other species if these flower nearby at the same time[250]. Plants take 4 - 5 years to flower from seed[200]. They generally breed true from seed[1].

5.2.766 Veronica arvensis

Corn Speedwell

4 tin 8 cyuc 0 kcak 0 tcan 1 dwat 0.2 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta Veronica arvensis is a ANNUAL growing to 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from March to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

dwatta Alterative Antiscorbatic DiureticThe herb is alterative, antiscorbatic and diuretic[240]. It is used in the treatment of scurvy, impurities of the blood etc[240]. It is also used as a remedy for scrofulous affections, especially of the skin, and is bruised and applied externally for healing burns, ulcers, whitlows and the mitigation of painful piles[240].

nrakta Europe, including Britain, from Sweden south and east to N. Africa, central and western Asia. ksacta Cultivated ground, grassland and on heaths, in more or less open habitats and usually on dry soils[17].

propta Seed - sow spring or autumn in situ.

nwatta Easily grown in a moderately fertile moisture retentive or dry well drained soil[200]. Prefers cool summers[200].

6 5 tlin

6.1 bwon

6.1.1 Elaeagnus x ebbingei

Elaeagnus, Ebbing's Silverberry tfo2n 5 tlin 9 cyuc 5 kcak 4 tcan 2 dwat 5 m hkuc pimhmimhtut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Elaeagnus x ebbingei is an evergreen Shrub growing to 5 m (16ft) by 5 m (16ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf all year, in flower from October to January, and the seeds ripen from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

kcakta Edible Parts: Fruit SeedEdible Uses: Fruit - raw or cooked[177]. A reasonable size, it is about 20mm long and 13mm wide although it does have a large seed[K]. The fully ripe fruit has a very rich flavour and makes pleasant tasting with a slight acidity[K]. The fruit should be deep red in colour and very soft when it is fully ripe, otherwise it will be astringent[K]. The flavour improves further if the fruit is stored for a day or two after being picked. The fruit ripens intermittently over a period of about 6 weeks from early to mid April until May[K]. Seed - raw or cooked. It can be eaten with the fruit though the seed case is rather fibrous[K]. The taste is vaguely like peanuts[K].

tcanta Companion Hedge HedgePlants can be grown as a hedge in very exposed positions, tolerating maritime exposure. The plants provide a very good protection from the wind, they are very resistant to damage by salt winds and are

also tolerant of regular trimming[75]. They have a strong vigorous growth and are faster growing than *E. macrophylla*[75, 200]. Because they fix atmospheric nitrogen, they make good companion plants and improve the growth of neighbouring species[K]. They can be planted in the line of an old shelter-belt of trees that is becoming bare at the base and will in time fill up the empty spaces and climb into the bottom parts of the trees[K].

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

nrakta A garden hybrid, *E. macrophylla* x *E. pungens* or *E. x. reflexa*. **ksacta** Not known in the wild.

propta Seed - this is a hybrid and it will not breed true from seed. If this is not a problem, then the seed is best sown as soon as it is ripe in a cold frame[78]. It should germinate freely within 4 weeks, though it may take 18 months[K]. Stored seed can be very slow to germinate, often taking more than 18 months. A warm stratification for 4 weeks followed by 12 weeks cold stratification can help[98]. The seed usually (eventually) germinates quite well[78]. Prick out the seedlings into individual pot as soon as they are large enough to handle and plant out when they are at least 15cm tall. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame. Rather slow, but you usually get a good percentage rooting[78]. June is the best time to take cuttings[202]. Cuttings of mature wood of the current year's growth, 10 - 12cm with a heel, November in a frame. Leave for 12 months. Fair to good percentage[78]. Layering in September/October. Takes 12 months[78].

nwatta A very easily grown plant, it succeeds in most soils that are well-drained[11, 200]. Prefers a soil that is only moderately fertile, succeeding in poor soils and in dry soils[11, 200]. A drought resistant plant once established, it can be grown on top of Cornish hedges (drystone walls with earth between two vertical layers of stones). It is very tolerant of shade and grows well under trees[200]. Plants are very tolerant of maritime exposure, growing well right by the coast[K]. Plants are hardy to about -20°C, but they can be deciduous in very cold winters[200]. Fruiting as it does in early April to May, this plant has excellent potential as a commercial fruit crop in Britain. The fruit is of a reasonable size and when fully ripe is very acceptable for dessert[K]. It should be fairly easy to selectively breed for improved fruit size and flavour[K]. Not all plants bear many fruits, though many specimens have been seen that produce very heavy crops on a regular basis[K]. Since this is a hybrid species, yields may be improved by growing a selection of cultivars or one of the parent plants nearby for cross pollination. *E. pungens* is perhaps the best candidate for this and its cultivar *E. pungens* 'Variegata' has been seen on a number of occasions with good crops of fruit next to *E. x ebbingei* plants that are also laden with fruit[K]. The cultivar *E. x ebbingei* 'Gilt Edge' is also probably a good pollinator[K]. Other cultivars worth looking at are 'Salcombe Seedling', which is said to flower more abundantly than the type[200] and 'Limelight', which has been seen with a good crop of fruits even on small bushes[K]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. An excellent companion plant, when grown in orchards it can increase yields from the fruit trees by up to 10%. Plants produce very aromatic flowers in late autumn and early winter[182]. This species is notably resistant to honey fungus[88, 200]. Sometimes whole branches die out for no apparent reason. This happens most frequently when it is grafted onto *E. multiflora*[182]. These branches should be removed from the plant. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

6.1.2 Lathyrus tuberosus

Earthnut Pea, Tuberous sweetpea
tfo2n 5 tlin 9 cyuc 5 kcaak 3 tcan 0 dwat 1.2 m hkuc
hmimhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Lathyrus tuberosus* is a PERENNIAL growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from June to July, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

kcaakta Edible Parts: RootEdible Uses: Root - cooked or raw[2, 27, 46, 61, 105]. Sweet and starchy, it is delicious when baked with a flavour that is somewhat like a sweet potato[183, K]. Taste trials consistently place this root very highly, it is certainly one of our favourites[K]. Unfortunately, yields are rather low and so the plant is only worthwhile growing as a taste treat, not as a staple crop[K].

tcanta Nitrogen fixer. Attractive flowers. Attracts wildlife.

nrakta Europe to W. Asia. Naturalized in Britain in a very few sites in E. England. **ksacta** Cornfields and hedgerows, avoiding acid soils[17].

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

nwatta An easily grown plant, succeeding in any moderately good garden soil[200]. It prefers a limestone soil in a warm position[13], and likes some shade[11]. A climbing plant, scrambling through other plants and supporting itself by tendrils[219]. It tends to be slightly invasive[187] with new stems emerging at some distance from the parent plant[219]. The earthnut pea has occasionally been cultivated for its edible root[2, 183]. Slugs are inordinately fond of this plant and will totally destroy it given a chance[K]. A good bee plant. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A suckering vine sending up suckers some distance main plant [1-2]. The root pattern is tuberous with swollen potato-like roots [1-2].

6.1.3 Elaeagnus multiflora ovata

Goumi
tfo2n 5 tlin 9 cyuc 5 kcaak 3 tcan 2 dwat m hkuc
hmimhtut cyutli hgakyuctcup hwicli hyishrasljutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Elaeagnus multiflora ovata* is a deciduous Shrub growing to 3 m (9ft) by 2 m (6ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from April to May, and the seeds ripen in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure. It can tolerate atmospheric pollution.

pcista The plant contains cytosine, which resembles nicotine and is similarly toxic[238]. The plant is poisonous when used in quantity[74, 174].

tcanta Insecticide Parasiticide ParasiticideThe plant is a source of an insecticide and parasiticide[74, 176]. No further details.

dwatta Anthelmintic Antibacterial Antifungal Antipruritic Astringent Bitter Carminative Diuretic Dysentery Eczema Febrifuge Leprosy Parasiticide Parasiticide Pectoral Stomachic Tonic UrinaryThe root is anthelmintic, antibacterial, antifungal, antipruritic, astringent, bitter, carminative, diuretic, febrifuge, parasiticide, pectoral, stomachic and tonic[61, 147, 174, 176, 178, 218, 279]. It is used internally in the treatment of jaundice, dysentery, diarrhoea and urinary infections[238]. It is used both internally and externally in the treatment of vaginitis, eczema, pruritis, ringworm, leprosy, syphilis, scabies and itching allergic reactions[238]. The root is harvested in the autumn and dried for later use[238]. The plant is anthelmintic and diuretic[218]. It also has antibacterial activity, inhibiting the growth of *Mycobacterium tuberculosis* and *Trichomonas vaginitis*[176, 218].

nrakta E. Asia - Russia to China. **ksacta** Scrub on mountain slopes, river valleys[74], especially on sandy soils[11]. Grassy places in lowland and waste ground, C. and S. Japan[58].

propta Seed - best sown as soon as it is ripe in a greenhouse[200]. Pre-soak stored seed for 12 hours in hot (not boiling) water and sow in late winter in a greenhouse[78]. Prick out the seedlings as soon as they are large enough to handle into individual pots in the greenhouse, and grow them on for 2 years under protected conditions. Plant them out into their permanent positions in early summer of their third year. Cuttings of young shoots with a heel, July/August in a frame[11]. Air-layering[200].

nwatta Succeeds in a well-drained moderately fertile soil in full sun[200]. Requires the protection of a sunny wall if it is to flower[182], and succeeds only in the mildest areas of the country. It grows best in the warmer areas of the country where the wood will be more readily ripened and better able to withstand winter cold[219]. Although hardy to at least -15°C[238], this species does not do very well in the relatively cool summers of Britain, the plant gradually weakens and eventually succumbs[11]. It can be grown in the milder areas of the country and be treated like a herbaceous perennial, growing afresh from the base each spring[233]. An important medicinal herb in China[61]. Plants should be container-grown and planted out whilst young, older plants do not transplant well[219]. A polymorphic species[58]. The flowers are produced on the current years growth[182]. Plants in this genus are notably resistant to honey fungus[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

6.1.28 Lotus uliginosus

Greater Bird's Foot Trefoil
tfo2n 5 tlin 9 cyuc 0 kcaak 3 tcan 0 dwat 0.4 m hkuc
htut cyutli tcuphja7n hwicli hyishrasljutnyik hpa7tli frusflatprikliwis hpa7tmwatli xre7t hjonli

drutta *Lotus uliginosus* is a PERENNIAL growing to 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It cannot grow in the shade. It prefers moist or wet soil.

pcista No reports of toxicity have been seen for this species but at least one member of the genus contains toxic cyanogenic glycosides[65, 76].

tcanta Insecticide Soil reclamationAn insecticide is obtained from the plant[153]. No more details are given. This species is used as a pioneer plant in the reclamation of peat

and pumice soils and on other wet acid soils that are unsuitable for the more commonly used *Trifolium* spp[200]. Nitrogen Fixer.

nrakta S.W. Europe - Portugal, Spain. **ksacta** Marshes, ditches, freshwater margins and wet grassland[50, 200].

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

nwatta Succeeds in wet acid soils[200]. Dislikes shade[200]. Does well on poor soils[61]. Suitable for naturalistic and conservation plantings in situations that approximate to its natural habitat[200]. A good bee plant[74]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

6.2 mran

6.2.1 Cornus kousa chinensis

Japanese Dogwood
5 tlin 8 cyuc 5 kcaak 2 tcan 0 dwat 10 m hkuc
hmimhtut cyutli tcup hwicli hrasljutnyikfrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Cornus kousa chinensis* is a deciduous Tree growing to 10 m (32ft) by 6 m (19ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in June, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcaakta Edible Parts: Fruit LeavesEdible Uses: Fruit - raw or cooked[61, 177]. Sweet and juicy[11, 183], it is very nice in small quantities[K]. Very seedy[105]. The skin is rather tough and unpleasant, but the pulp is delicious with a custard-like texture[K]. This fruit gained very high marks from a group of 7 people in a fruit-tasting visit to various gardens[K]. The fruit is about 2cm in diameter[200]. Young leaves - cooked[105, 177, 183].

tcanta WoodWood - very hard and heavy. Used for materials[151].

nrakta E. Asia - China. **ksacta** Thickets, 1200 - 2200 metres[109].

propta Seed - best sown as soon as it is ripe in a cold frame or in an outdoors seedbed if there is sufficient seed[80, 113]. The seed must be separated from the fruit flesh since this contains germination inhibitors[80, 164]. Stored seed should be cold stratified for 3 - 4 months and sown as early as possible in the year[164]. Scarification may also help as may a period of warm stratification before the cold stratification[80, 164]. Germination, especially of stored seed, can be very slow, taking 18 months or more[164]. Prick out the seedlings of cold-frame sown seeds into individual pots as soon as they are large enough to handle and grow the plants on for their first winter in a greenhouse, planting out in the spring after the last expected frosts. Cuttings of half-ripe side shoots, July/August in a frame[188]. Cuttings of mature wood of the current year's growth, taken with a heel if possible, autumn in a cold frame. High percentage[78]. Layering of new growth in June/July. Takes 9 months[78].

nwatta An easily grown plant, it succeeds in any soil of good or moderate fertility[1], ranging from acid to shallow chalk[200]. Does not like chalky soils according to other reports[184, 188]. Grows well in heavy clay soils. Prefers a rich well-drained loamy soil and a position that is at least partially sunny[11]. A very ornamental plant[1], it is hardy to about -20°C[184]. A number of named forms have been developed for their ornamental value[182]. Plants are slow-growing when young, they speed up somewhat after a few years but then soon slow down again[202]. This sub-species of *C. kousa* grows more freely, flowering and fruiting better in Britain though it barely differs in appearance from

and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

tcanta Fibre FuelA fibre from the bark is used for ropes and paper making[146, 158]. The wood is a good fuel[146, 158].

dwatta Carminative Cholera Diuretic TonicThe roots are carminative, diuretic and tonic[240, 272]. They are used in the treatment of bilious complaints[240, 243].The juice of the root, sometimes combined with the bark juice of Bauhinia malabarica, is used in the treatment of cholera[272]. The juice of the bark is used in the treatment of peptic ulcers[272].

nrakta E. Asia - Himalayas to W. China. ksacta Dry grassy slopes and in glades in deodar forests to 2700 metres[146]. Forest margins, forests, thickets, mountain slopes, rocky places, roadsides and ditches at elevations of 1000 - 4000 metres[266].

propta Seed - best sown as soon as it is ripe in a greenhouse. Scarify and pre-soak stored seed for 5 hours in warm water then sow March in a greenhouse. The seed usually germinates within 1 - 4 months at 25°C. Prick out the seedlings into individual pots once they are large enough to handle and grow them on in the greenhouse for their first winter. Plant them out in late spring or early summer and consider giving them some protection from frost in their first winter outdoors. Cuttings of half-ripe wood with a heel, July/August in a frame. Division as the plant comes into growth in the spring. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring. Root cuttings in winter.

nwatta Succeeds in most soils so long as they are well-drained[182, 200]. Requires a sunny sheltered position[175, 182]. Plants are hardy to about -15°C[184]. Requires long hot summers to be at its best, the flowers are produced on the current years growth and do not open in cold wet seasons[11]. Plants send up new shoots 1 - 1.5m long annually from a woody base[11]. If the plant is not cut back to the ground by winter cold then it is best to prune it hard in late winter in order to encourage better flowering[182]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

6.1.25 Gleditsia macracantha

tfo2n 5 tlin 9 cyuc 0 kcaak 0 tcan 1 dwat m hkuc htut cyutli hgatkuyctcup hwicli hrasjlutnyik hpa7tli flatprik-lwis hpa7tmwatli xre7t hjonli

drutta Gleditsia macracantha is a deciduous Tree growing to 18 m (59ft 1in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from April to May, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. It can tolerate atmospheric pollution.

tcanta SoapA soap substitute is obtained from the seedpods[46, 61, 109]. Wood - strong, durable, coarse-grained[82].

dwatta AnaestheticThe twigs and the leaves contain the alkaloids gleditschine and stenocarpine[4]. Stenocarpine has been used as a local anaesthetic whilst gleditschine causes stupor and loss of reflex activity[4].

nrakta E. Asia - China. ksacta Streamsidess and open country at low altitudes[109].

propta Seed - pre-soak for 24 hours in warm water and then sow in spring in a greenhouse[78]. The seed should have swollen up, in which case it can be sown, if it has not swollen then soak it for another 24 hours in warm water. If this does not work then file away some of the seed coat but be careful not to damage the embryo[78]. Further soaking should then cause the seed to swell. One it has swollen, the seed should germinate within 2 - 4 weeks at 20°C. As soon as they are large enough to handle, prick the seedlings out into

individual deep pots and plant them out into their permanent positions in the summer. Give the plants some protection from the cold for their first few winters outdoors.

nwatta Easily grown in a loamy soil, requiring a sunny position[11]. Succeeds in most soils[200] including sandy ones[188]. Tolerates drought once established[1] and atmospheric pollution[200]. Rather tender when young, it grows best in S. Britain[11]. Trees have a light canopy, they come into leaf late in the spring and drop their leaves in early autumn[200] making them an excellent top storey tree in a woodland garden. The flowers have a delightful vanilla fragrance[245]. Plants in this genus are notably resistant to honey fungus[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

6.1.26 Colutea x media

tfo2n 5 tlin 9 cyuc 0 kcaak 0 tcan 0 dwat m hkuc hmimhtut cyutli kyucutcup hwicli hyishrasjlutnyik hpa7tli flatprik-lwis hpa7tmwatli xre7t hjonli

drutta Colutea x media is a deciduous Shrub growing to 3 m (9ft) by 3 m (9ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

tcanta Hedge Hedge Soil stabilizationThis species has an extensive root system and is useful for planting on dry sunny banks for stabilizing the soil[200]. Plants can be grown as a hedge[200].

nrakta A hybrid of garden origin, C. arborescens x C. orientalis[200]. ksacta Not known in the wild.

propta Seed - pre-soak for 24 hours in hot water and sow late winter in a greenhouse[113]. Scarification can help speed up the germination process[164]. Germination can be slow and erratic[200], though treated seed usually germinates in 1 - 3 months at 20°C[164]. As soon as they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out in late spring or early summer, after the last expected frosts. This species is a hybrid and so is unlikely to breed true from seed. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame[78]. Cuttings are not very long-lived[78].

nwatta Requires a well-drained soil and a sunny sheltered position[182, 200]. Succeeds in poor and in dry soils, growing well on sunny banks[182]. Tolerates atmospheric pollution and salt-laden winds[200]. Plants are hardy to about -20°C[200]. Flowers are produced on the current year's growth[200]. Plants in this genus are notably resistant to honey fungus[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

6.1.27 Sophora flavescens

Ku Shen, Shrubby sophora
tfo2n 5 tlin 9 cyuc 0 kcaak 0 tcan 3 dwat 1.5 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik-lwis hpa7tmwatli xre7t hjonli

drutta Sophora flavescens is an evergreen Shrub growing to 1.5 m (5ft) by 1 m (3ft 3in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from July to August, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Fruit SeedEdible Uses: Fruit - raw or cooked[1, 3, 11, 15, 46, 177]. Pleasantly acid when ripe, they are usually made into pies, preserves etc[183]. Quite fiddly and difficult to pick without breaking the young shoots[200], this sub-species carries the fruit on longer stalks than the species and might therefore be easier to pick[K]. The fruit must be fully ripe before it can be enjoyed raw, if even slightly under-ripe it will be quite astringent[K]. The fruit is about 10mm long and contains a single large seed[275, K] Seed - raw or cooked. It can be eaten with the fruit though the seed case is rather fibrous[K].

tcanta Hedge Hedge RootstockPlants can be grown as a hedge in exposed positions, tolerating maritime exposure. A hedge in a very exposed position at Rosewarne in N. Cornwall was 3.5 metres tall in 1989[K]. Often used as a rootstock for evergreen species that are hard to grow from cuttings. It frequently sprouts from the base and can out-compete the scion[182].

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

nrakta E. Asia - China and Japan. ksacta Thickets and thin woods in hills and on lowland, at elevations of 600 - 1800 metres[58].

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

nwatta An easily grown plant[184], it succeeds in most soils that are well-drained[11, 200]. Prefers a soil that is only moderately fertile, succeeding in poor soils and in dry soils[11, 200]. Prefers a light sandy loam and a sunny position but succeeds in light shade[11, 200]. Very drought and wind resistant[1, 11, 200]. Tolerates atmospheric pollution[160]. Plants are hardy to about -20°C[184], but the roots are hardy to -30°C (although top growth will be killed at this temperature). Cultivated for its edible fruit in Japan, there are some named varieties[3, 11, 183]. Plants can crop in 4 years from cuttings[160]. They bear heavily in Britain[11]. The fruit is well hidden in the shrub and is quite difficult to harvest without damaging the plant[K]. This sub-species produces brown fruits on long stalks[200], would this be any easier to harvest?[K] This species is notably resistant to honey fungus[88, 200]. Birds love the fruits[160]. There is some confusion over the correct name for this species. In the on-line version of the Flora of Japan it is referred to as *Elaeagnus montana ovata*[275]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. An excellent companion plant, when grown in orchards it can increase yields from the fruit trees by up to 10%. The small flowers are deliciously scented, their aroma pervading the garden on calm days[K].

6.1.4 Elaeagnus multiflora

Goumi, Cherry silverberry
tfo2n 5 tlin 9 cyuc 5 kcaak 3 tcan 2 dwat m hkuc hmimhtut cyutli hgatkuyctcup hwicli hyishrasjlutnyik hpa7tli flatprik-lwis hpa7tmwatli xre7t hjonli

drutta Elaeagnus multiflora is a deciduous Shrub growing to 3 m (9ft) by 2 m (6ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from April to May, and the seeds ripen

in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: Fruit SeedEdible Uses: Fruit - raw or cooked[1, 3, 11, 15, 46, 177]. Pleasantly acid when ripe, they make a very good dessert fruit[K] though they are usually made into pies, preserves etc[183]. Quite fiddly and difficult to pick without breaking the young shoots[200]. The fruit must be fully ripe before it can be enjoyed raw, if even slightly under-ripe it will be quite astringent[K]. The fruit contains a single large seed[K]. Seed - raw or cooked. It can be eaten with the fruit though the seed case is rather fibrous[K].

tcanta Companion Hedge Hedge RootstockPlants can be grown as a hedge in exposed positions, tolerating maritime exposure. Reasonably fast growing and providing a good screen in the summer, though much more open in the winter. It is a good companion hedge to grow, the plants enriching the soil and improving the growth of neighbouring plants[K]. A hedge in a very exposed position at Rosewarne in N. Cornwall was 3.5 metres tall in 1989[K]. Often used as a rootstock for evergreen species that are hard to grow from cuttings. It frequently sprouts from the base and can out-compete the scion[182].

dwatta Antitussive Astringent CancerThe fruit of many members of this genus is a very rich source of vitamins and minerals, especially in vitamins A, C and E, flavanoids and other bio-active compounds. It is also a fairly good source of essential fatty acids, which is fairly unusual for a fruit. It is being investigated as a food that is capable of reducing the incidence of cancer and also as a means of halting or reversing the growth of cancers[214]. The leaves are used in the treatment of coughs[218]. The fruit is prescribed in the treatment of watery diarrhoea[218]. The root is astringent, a decoction is used to treat itch and foul sores[218].

nrakta E. Asia - China and Japan. ksacta Thickets and thin woods in hills and on lowland, at elevations of 600 - 1800 metres[58].

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

nwatta An easily grown plant[184], it succeeds in most soils that are well-drained[11, 200]. Prefers a soil that is only moderately fertile, succeeding in poor soils and in dry soils[11, 200]. Prefers a light sandy loam and a sunny position but succeeds in light shade[11, 200]. Very drought and wind resistant[1, 11, 200]. Tolerates atmospheric pollution[160]. Plants are hardy to about -20°C[184], but the roots are hardy to -30°C (although top growth will be killed at this temperature). A very variable species[266], it is often cultivated for its edible fruit in Japan, there are some named varieties[3, 11, 183]. Plants can crop in 4 years from cuttings[160]. They bear heavily in Britain[11]. The synonym *E. longipes* is sometimes accepted as a distinct species, differing mainly in having very long peduncles about 2.5cm in length[214]. The fruit is well hidden in the shrub and is quite difficult to harvest without damaging the plant[K]. The ssp. *E. multiflora ovata*. (Maxim.)Servettaz. produces brown fruits on long stalks[200], would this be any easier to harvest?[K] This species is notably resistant to honey fungus[88, 200]. Birds love the fruits[160]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. An excel-

lent companion plant, when grown in orchards it can increase yields from the fruit trees by up to 10%. The small flowers are deliciously scented with a lilac-like smell, their aroma pervading the garden on calm days[K]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

6.1.5 Pueraria montana lobata

Kudzu Vine
tfo2n 5 tlin 9 cyuc 4 kcaak 4 tcan 5 dwat m hkuc
htut cyutli hgattcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Pueraria montana lobata is a PERENNIAL CLIMBER growing to 10 m (32ft 10in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil and can tolerate drought.

pcista Although no specific mention has been found for this species, the leaves of the closely related *P. hirsuta* (which might be no more than a synonym for this species) have barbed hairs and these can cause severe irritation[151]. Possible interaction with antiplatelet and antiidiabetic medication. Rare case of a patient developing bleeding after surgery possibly due to Kudzu [301].

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Root - cooked[105, 171]. Rich in starch[109]. The root can be up to 1.8 metres long[174] and has been known to weigh 35 kilos or more[269]. The root contains about 10% starch, this can be extracted and used as a crispy coating in deep fried foods, or for thickening soups etc[174, 183]. It can also be made into noodles, or like agar or gelatine is used as a gelling agent for salads[183]. This plant is a staple food in Japan, the peeled root contains about 2.1% protein, 0.1% fat, 27.1% carbohydrate, 1.4% ash[179]. The starch of the roots contains (per 100 g) 340 calories, 16.5 percent moisture, 0.2 g protein, 0.1 g fat, 83.1 g total carbohydrate, 0.1 g ash, 35 mg Ca, 18 mg P, 2.0 mg Fe, and 2 mg Na[269]. A nutritional analysis for the whole root is available. Flowers - cooked or made into pickles[183]. Stems and young leaves - raw or cooked[105]. A very nutritious food, the fresh young shoots taste like a cross between a bean and a pea[183]. The cooked leaves contain (per 100 g) 36 calories, 89.0 percent moisture, 0.4 g protein, 0.1 g fat, 9.7 g total carbohydrate. 7.7 g fiber, 0.8 fat, 34 mg Ca, 20 mg P, 4.9 mg Fe, 0.03 mg thiamin, 0.91 mg riboflavin, 0.8 mg niacin[269].

tcanta Fibre Fodder Paper Soil reclamation Soil stabilizationA tough, strong fibre from the stems is used to make ropes, cables, coarse cordage and textiles[61, 109, 151, 169, 189]. The fibre is 2 - 3mm long and can be used to make paper. Straight first year stems, 2 - 2.7 metres long, are harvested in mid summer, the leaves are removed and the stems steamed until the fibres can be stripped. The fibres are then cooked for 2 hours with lye, tough vines might require 4 hours cooking, and the fibre put in a ball mill for 3 hours. The resulting paper is greenish/cream in colour[189]. Can be used as a ground cover plant in a sunny position[188]. Plants have an extensive root system which can be 1.8 metres deep, they are used for erosion control and for rebuilding depleted soils[171, 174]. A member of the Leguminosae, so it adds nitrogen to the soil through the actions of root bacteria.

dwatta Anti diarrhoeal Antidote Antiemetic Antihistamine Antineoplastics Antipirnetic Antisporic Antipyretic Antispasmodic Antivinous Cardiac Demulcent Depurative Diaphoretic Dysentery Febrifuge Galactagogue Hypoglycaemic Hypotensive StypticThe kudzu vine, known as Ge Gen in China, is commonly used in Chinese herbalism, where it is

considered to be one of the 50 fundamental herbs[218]. Recent research has shown that compounds called 'daidzin' and 'daidzein', which are contained in the roots and the flowers, are a safe and effective method for treating alcohol abuse[238]. They work by suppressing the appetite for alcohol, whereas existing treatments interfere with the way the alcohol is metabolised and can cause a build-up of toxins[238]. The plant is often used in combination with *Chrysanthemum x morifolium* in treating alcohol abuse[254]. The flowers and the roots are antidote, antiemetic, antipyretic, antispasmodic, demulcent, diaphoretic, digestive, febrifuge, hypoglycaemic and hypotensive[174, 176, 218, 222, 238]. A concoction of the flowers and tubers is used to treat alcoholism, fever, colds, diarrhoea, dysentery, acute intestinal obstruction etc[174, 176, 218, 222]. It is useful in the treatment of angina pectoris and migraine[218]. The root is frequently used as a remedy for measles, often in combination with *Cimicifuga foetida*[254]. The root contains puerarin. This increases the blood flow to the coronary artery and protects against acute myocardial ischaemia caused by the injection of pituitrin[176]. The root can be harvested from the autumn to the spring and is used fresh or dried[238]. The flowers are harvested just before they are fully open and are dried for later use[238]. The stems are galactagogue and are also applied as a poultice to incipient boils, swellings, sore mouths etc[218, 222]. The seed is used in the treatment of hangover and dysentery[218, 222]. The leaves are styptic[218].

nrakta E. Asia - China, Japan, Korea. ksacta Thickets and thin woods all over Japan[58].

propta Pre-soak the seed for 12 hours in warm water and sow in a warm greenhouse in early spring. Germination should take place within 2 weeks. Prick out the seedlings into individual pots when they are large enough to handle and plant them out after the last expected frosts[200]. Cover the young plants with a frame or cloche until they are growing away well. Division of young shoots from the crown. The young shoots are removed in the spring with some of the underground part of the stem, preferably with some roots already formed. They are potted up and will usually develop new roots from the nodes. They are planted out in the summer if growth is sufficient, otherwise they are grown on in pots for a year and planted out late the following spring.

nwatta Agroforestry Services: Nitrogen Fodder: Bank Fodder: Pasture Industrial Crop: Fiber Management: Hay Minor Global Crop Staple Crop: ProteinGrows best on well-drained loam soil of good fertility[269]. Succeeds in most well-drained soils in a sunny position[200], though it does not make good growth on very light poor sand or on poorly drained heavy clay[269]. Plants cannot stand waterlogging on any soil[269]. A deep-rooted pant, once established it is very drought resistant[171, 269]. The plant is reported to tolerate an annual precipitation in the range of 97 to 214cm, an annual mean temperature in the range of 12.2 to 26.7°C, and a pH of 5.0 to 7.1[269]. Plants are hardy to about -15°C, they can resprout from the base if they are cut down by frosts[200]. A twining plant, the top growth is not generally hardy in Britain and plants do not always flower here[1]. Plants can be grown as annuals in Britain, the seed is started off in a greenhouse and is planted out after the last frosts[1]. They can grow up to 6 metres in their first year and make good temporary screens[1]. The plant succeeds outdoors in Berlin, but it has to be propagated vegetatively there[74]. This plant is cultivated for its edible root in Japan and China[183]. The flowers have a sweet vanilla scent[245]. When grown in warmer climates than Britain the root can be invasive and plants have become weeds[182, 219]. Introduced into the southern N. American states in 1876 as a soil stabilizer, the plant has spread very widely (it can grow up to 30cm in a day), has swamped out native vegetation, including large trees. It is considered to be one of the most obnoxious weeds in that region[274]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

Cuttings of mature wood, taken as soon as the leaves fall in autumn, outdoors in sandy soil.

nwatta Thrives on poor and dryish soils, even on chalk, but prefers to be near water[11, 200]. Prefers a heavy soil and a damp situation[1, 11]. Grows well in heavy clay soils. Tolerates very infertile sites[11, 200]. This species has a symbiotic relationship with certain soil micro-organisms, these form nodules on the roots of the plants and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. A very ornamental tree[1], it is very fast growing, reaching 12 metres tall in 20 years in an exposed maritime position at Rosewarne in N. Cornwall[75]. Very tolerant of salt winds, it establishes rapidly in exposed positions[75]. According to World Economic Plants, the correct author of this species is (Loisel.)Loisel. and not Desf. as we have given here. However, since all our other sources have quoted Desf., we have decided not to alter it at this time (1999)[K]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

6.1.22 Gleditsia aquatica

Water Locust
tfo2n 5 tlin 9 cyuc 0 kcaak 0 tcan 0 dwat 12 m hkuc
htut cyutli tucphja7n hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Gleditsia aquatica is a deciduous Tree growing to 12 m (39ft 4in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf from June to October, in flower from July to August, and the seeds ripen from October to December. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist or wet soil. It can tolerate atmospheric pollution.

tcanta Soil stabilization WoodHaving an extensive root system, it is planted for stabilizing wet banks and marshes[200]. Wood - heavy, very hard, strong, durable in contact with the soil, coarse-grained[82, 229]. It weighs 46lb per cubic foot[235]. The wood is extremely durable and is used primarily for making fence posts[229].

nrakta South-eastern N. America - N. Carolina to Florida, west to Texas, Indiana and Arkansas. ksacta Rich lands of river valleys that are subject to inundation, often for a considerable part of the year[82, 229].

propta Seed - pre-soak for 24 hours in warm water and then sow in spring in a greenhouse[78]. The seed should have swollen up, in which case it can be sown, if it has not swollen then soak it for another 24 hours in warm water. If this does not work then file away some of the seed coat but be careful not to damage the embryo[78]. Further soaking should then cause the seed to swell. One it has swollen, the seed should germinate within 2 - 4 weeks at 20°C. As soon as they are large enough to handle, prick the seedlings out into individual deep pots and plant them out into their permanent positions in the summer. Give the plants some protection from the cold for their first few winters outdoors.

nwatta Easily grown in a loamy soil, requiring a sunny position[11]. Succeeds in most soils[200]. Tolerates atmospheric pollution[200]. Rather tender when young, it grows best in S. Britain[11]. A slow-growing tree[1], it is growing well at the Hillier Arboretum in Hampshire where a tree was 7 metres tall and 8 metres wide in 1993[K]. Trees have a light canopy, they come into leaf late in the spring and drop their leaves in early autumn[200] making them an excellent top storey tree in a woodland garden. Plants in this genus are notably resistant to honey fungus[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen.

Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

6.1.23 Ceanothus species

tfo2n 5 tlin 9 cyuc 0 kcaak 0 tcan 0 dwat 2 m hkuc
hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Ceanothus species is an evergreen Shrub growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from August to October. The species is hermaphrodite (has both male and female organs). It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

tcanta A green dye is obtained from the flowers[168]. All parts of the plant are rich in saponins - when crushed and mixed with water they produce a good lather which is an effective and gentle soap[168, 169]. This soap is very good at removing dirt, though it does not remove oils very well. This means that when used on the skin it will not remove the natural body oils, but nor will it remove engine oil etc[K] The flowers are a very good source, when used as a body soap they leave behind a pleasant perfume on the skin[K]. The developing seed cases are also a very good source of saponins[K].

nrakta A collection of garden hybrids of uncertain parentage. ksacta Not known in the wild.

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed should be pre-soaked for 12 hours in warm water and then given 1 - 3 months stratification at 1°C[138, 200]. Germination usually takes place in 1 - 2 months at 20°C[138]. One report says that the seed is best given boiling water treatment, or heated in 4 times its volume of sand at 90 - 120°C for 4 - 5 minutes and then soaked in warm water for 12 hours before sowing it[214]. The seed exhibits considerable longevity, when stored for 15 years in an air-tight dry container at 1 - 5°C it has shown little deterioration in viability[214]. The seed is ejected from its capsule with some force when fully ripe, timing the collection of seed can be difficult because unless collected just prior to dehiscence the seed is difficult to extract and rarely germinates satisfactorily[214]. Prick out the seedlings into individual pots as soon as they are large enough to handle. Grow them on in the greenhouse for at least their first winter and plant them out into their permanent positions in late spring or early summer. This is a garden hybrid and it will not breed true from seed. Cuttings of half-ripe wood, taken at a node[200], July/August in a frame[11]. Cuttings of mature wood of the current year's growth, 7 - 12 cm with a heel, October in a cold frame[78]. The roots are quite brittle and it is best to pot up the callused cuttings in spring, just before the roots break[78]. Good percentage.

nwatta Prefers a warm sunny position but tolerates light shade[11, 200]. Tolerates some lime, but will not succeed on shallow chalk[200]. Some of the cultivars included here are tolerant of clay soils[260]. Plants dislike root disturbance, they should be planted out into their permanent positions whilst still small[182]. Dislikes heavy pruning, it is best not to cut out any wood thicker than a pencil[182]. Hybridizes freely with other members of this genus[200]. Some members of this genus have a symbiotic relationship with certain soil micro-organisms, these form nodules on the roots of the plants and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200, 212].

6.1.24 Desmodium elegans

tfo2n 5 tlin 9 cyuc 0 kcaak 0 tcan 2 dwat 1.5 m hkuc
htut cyutli tucp hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Desmodium elegans is a deciduous Shrub growing to 1.5 m (5ft) by 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from August to October, and the seeds ripen from September to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils

large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. If you have sufficient seed, then it can also be sown in situ in mid spring[200]. Division in spring. It may not transplant well so care should be taken[200].

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

6.1.19 Melilotus indicus

Annual Yellow Sweetclover
tfo2n 5 tlin 9 cyuc 1 kcak 0 tcan 2 dwat 1 m hkuc htut cyutli kyuctup hwicli hrasljutnyik hpa7tli priklwis hpa7tmwatli xre7t hjonli

drutta Melilotus indicus is a ANNUAL growing to 1 m (3ft 3in) by 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

pcista The dried leaves can be toxic, though the fresh leaves are quite safe[76, 218]. This is due to the presence of coumarin, the substance that gives some dried plants the smell of new mown hay. If taken internally it can prevent the blood from clotting.

kcakta Edible Parts: LeavesEdible Uses: Leaves - cooked[105].

tcanta Fodder RepellentThe leaves repel insects. They have been placed in beds to repel bedbugs[257].

dwatta Antibacterial Anticoagulant Astringent Emollient Laxative Narcotic PoulticeThe seed is made into a gruel and used in the treatment of bowel complaints and infantile diarrhoea[218, 240]. The plant is discutient, emollient, astringent, strongly laxative and narcotic[218, 240, 257]. It is used externally as a poultice or plaster on swellings[218, 240]. The plant contains coumarin, which is an anticoagulant[218]. The plant also contains dicumarol, which is a broad spectrum bactericide[218].

nrakta Europe - Mediterranean to E. Asia. Naturalized in Britain. ksacta Fields and waste places in S. England and Wales[17].

propta Seed - sow spring to mid-summer in situ[87]. Pre-soaking the seed for 12 hours in warm water will speed up the germination process, particularly in dry weather[K]. Germination will usually take place within 2 weeks.

nwatta Dislikes shade. This species is often cultivated as a fodder crop and cultivars low in coumarin have been developed[218]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. When removing plant remains at the end of the growing season, it is best to only remove the aerial parts of the plant, leaving the roots in the ground to decay and release their nitrogen.

6.1.20 Psoralea orbicularis

Roundleaf Leather Root
tfo2n 5 tlin 9 cyuc 1 kcak 0 tcan 1 dwat 0.1 m hkuc htut cyutli kyuctup hwicli hrasljutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Psoralea orbicularis is a PERENNIAL growing to 0.1 m (0ft 4in) by 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 6. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

pcista Although no specific mention of toxicity for this species has been found, at least some members of this genus

contain furanocoumarins, these substances can cause photosensitivity in some people[65].

kcakta Edible Parts: LeavesEdible Uses: Leaves - cooked[105, 161, 257].

tcanta Soil stabilizationThe plant is a good soil stabilizer in its natural environment[200].

dwatta Blood purifier FebrifugeA decoction of the root used as a blood purifier and in the treatment of fevers[257]. nrakta South-western N. America. ksacta Moist places below 1500 metres in California[71].

propta Pre-soak the seed for 24 hours in warm water and then sow in early to mid spring in a greenhouse. Either sow the seed in individual pots or pot up the young seedlings as soon as possible in order to avoid root disturbance. Grow them on in the pots until planting out in their final positions. It is usually impossible to transplant this species without fatal damage to the root[200]. Division in spring. With great care since the plant resents root disturbance. It is virtually impossible to divide this species successfully[200].

nwatta Succeeds in an ordinary garden soil[1]. We have very little information on this species but it is growing at Kew in the system beds and seems to be thriving there[K]. Plants are very intolerant of root disturbance, they are best planted out into their permanent positions whilst still small[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

6.1.21 Alnus cordata

Italian Alder
tfo2n 5 tlin 9 cyuc 0 kcak 4 tcan 0 dwat 25 m hkuc hmimhtut cyutli kyuctuphia7n hwicli hysiljutnyikfrip hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Alnus cordata is a deciduous Tree growing to 25 m (82ft) by 8 m (26ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf from April to December, in flower in March. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. It can fix Nitrogen. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry moist or wet soil. The plant can tolerate maritime exposure.

tcanta Hedge Pioneer ShelterbelAn excellent wind-break for maritime areas[75], it grows quite quickly and establishes well even in very windy sites[K]. Trees 5 years old from seed have reached 4 metres in height and are showing no signs of wind-shaping in a very exposed site in Cornwall[K]. This is an excellent pioneer species for re-establishing woodlands on disused farmland, difficult sites etc. Its fast rate of growth means that it quickly provides sheltered conditions to allow more permanent woodland trees to become established. In addition, bacteria on the roots fix atmospheric nitrogen - whilst this enables the tree to grow well in quite poor soils it also makes some of this nitrogen available to other plants growing nearby. Alder trees also have a heavy leaf canopy and when the leaves fall in the autumn they help to build up the humus content of the soil. Alder seedlings do not compete well in shady woodland conditions and so this species gradually dies out as the other trees become established[K].

nrakta Europe - S. Italy, Corsica. ksacta Very rarely self-sown in Britain, but not naturalised.

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

6.1.6 Trigonella foenum

Fenugreek, Sicklefruit fenugreek
tfo2n 5 tlin 9 cyuc 4 kcak 0 tcan 5 dwat 0.6 m hkuc htut cyutli kyuctup hwicli hrasljutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Trigonella foenum-graecum is a ANNUAL growing to 0.6 m (2ft) by 0.4 m (1ft 4in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

pcista The seed contains 1% saponins[240]. Although poisonous, saponins are poorly absorbed by the human body and so most pass through without harm. Saponins are quite bitter and can be found in many common foods such as some beans. They can be removed by carefully leaching the seed or flour in running water. Thorough cooking, and perhaps changing the cooking water once, will also remove most of them. However, it is not advisable to eat large quantities of food that contain saponins. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K]. Care for diabetics on antidiabetic allopathic as may lower blood sugar. Can affect drug absorption as high fibre content. Constituents can alter the effects of monoamine oxide inhibitors [301].

kcakta Edible Parts: Leaves Seed SeedpodEdible Uses: Coffee Condiment TeaSeed - cooked or sprouted and eaten raw[2, 4, 21, 34]. It has quite a strong spicy flavour, not unlike lovage or celery[4, 183]. When ground into a powder, the seed is a principal ingredient of curries and mango chutney[244], it is also used in pickles and spice mixes, as a flavouring in bread etc[4, 183, 238]. The seed is usually lightly roasted before use in order to reduce the bitterness[238]. The seed is about 3mm long, about 10 - 20 seeds being produced in each pod[4]. A good source of many essential elements such as iron, phosphorus and sulphur[244], the seed contains about 6% moisture, 23% protein, 10% carbohydrate, 8% fat, 10% fibre and 4.3% ash[61]. The ground seeds are used to give a maple syrup flavour to foods[183]. The seed can be soaked for 12 hours in warm water and then allowed to sprout for 3 - 5 days[244]. These sprouted seeds have a spicy flavour and can be added to salads or cooked[238, K]. An essential oil obtained from the seed is used as a food flavouring in imitation maple syrup, vanilla compositions, liquorice, pickles etc[183]. It also has medicinal virtues[57]. The ground up seeds can also be used as a substitute for maple syrup[4]. Leaves - raw or cooked[2, 4, 7, 34]. Very aromatic, in small quantities they can be added to salads, otherwise they are used as a potherb, a flavouring for root vegetables, an ingredient of curries etc[183, 238]. Seedpods - cooked[105]. The roasted seed is a coffee substitute[2, 177, 183]. A soothing tea is made from the leaves and the seed[21, 183].

tcanta Cosmetic Dye Essential Green manure Hair ParasiticideAn essential oil is obtained from the seed - used as a food flavouring and medicinally. The dried plant has a strong aroma of hay[4]. The crushed seed, mixed with oil and massaged into the scalp, is recommended for glossy hair[244]. An infusion of the seed, used as a skin lotion, is said to be good for the complexion[244]. A good green manure crop, it is fast growing and vigorous[200], producing a lot of bulk and fixing a large quantity of atmospheric nitrogen[87]. A yellow dye is obtained from the seed[61].

dwatta Anticholesterolemic Antiinflammatory Antiphlogistic Antitumor Appetizer Cardiotonic Carmivative Demulcent Deobstruent Diuretic Emollient Expectorant Febrifuge Galactogogue Hypoglycaemic Hypotensive Laxative Parasiticide RestorativeFenugreek is much used in herbal medicine, especially in North Africa, the Middle East and India. It has a wide range of medicinal applications[254]. The seeds are very nourishing and are given to convalescents and to encourage weight gain, especially in anorexia nervosa[254]. The seeds should not be prescribed medicinally for pregnant women since they can induce uterine contractions[238, 254]. Research has shown that the seeds can inhibit cancer of the liver, lower blood cholesterol levels and also have

an antidiabetic effect[254]. The seed and leaves are anticholesterolemic, anti-inflammatory, antitumor, carminative, demulcent, deobstruent, emollient, expectorant, febrifuge, galactogogue, hypoglycaemic, laxative, parasiticide, restorative and uterine tonic[4, 7, 21, 147, 165, 176, 238]. The seed yields a strong mucilage and is therefore useful in the treatment of inflammation and ulcers of the stomach and intestines[4, 254]. Taken internally, a decoction of the ground seeds serves to drain off the sweat ducts[7]. The seed is very nourishing and body-building and is one of the most efficacious tonics in cases of physical debility caused by anaemia or by infectious diseases, especially where a nervous factor is involved[7, 244]. It is also used in the treatment of late-onset diabetes, poor digestion (especially in convalescence), insufficient lactation, painful menstruation, labour pains etc[238, 244]. The seeds freshen bad breath and restore a dulled sense of taste[254]. Externally, the seeds can be ground into a powder and used as a poultice for abscesses, boils, ulcers, burns etc, or they can be used as a douche for excessive vaginal discharge[4, 244, 254]. The leaves are harvested in the growing season and can be used fresh or dried[238]. The seeds are harvested when fully ripe and dried for later use[238]. Compounds extracted from the plant have shown cardiotonic, hypoglycaemic, diuretic, antiphlogistic and hypotensive activity[218]. One of its constituent alkaloids, called 'trigonelline', has shown potential for use in cancer therapy. The seed contains the saponin diosgenin, an important substance in the synthesis of oral contraceptives and sex hormones[244], whilst saponins in the plant have been extracted for use in various other pharmaceutical products[238]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Trigonella foenum-graecum for loss of appetite, inflammation of the skin (see [302] for critics of commission E).

nrakta Europe - S. France. ksacta Field weeds, uncultivated ground, dry grasslands and hillsides[200].

propta Pre-soak the seed for 12 hours in warm water and then sow in spring in situ.

nwatta Succeeds in ordinary garden soil[1], preferring a well-drained loamy soil in full sun[200]. Requires a warm, sheltered position in Britain[244]. Plants are hardy to about -15°C[238]. Fenugreek is widely cultivated for its edible seed in warm temperate and tropical regions, there are some named varieties[183]. Seed production is more problematic in Britain due to the cooler and moister summers. The seed is ripened intermittently over a period of some weeks making harvesting more complicated[87]. Plants take about 16 weeks to mature in warmer climes, probably about 4 weeks longer in Britain[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. When removing plant remains at the end of the growing season, it is best to only remove the aerial parts of the plant, leaving the roots in the ground to decay and release their nitrogen.

6.1.7 Gleditsia japonica

tfo2n 5 tlin 9 cyuc 3 kcak 0 tcan 1 dwat 20 m hkuc htut cyutli hgatkyuctup hwicli hrasljutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Gleditsia japonica is a deciduous Tree growing to 20 m (65ft) by 12 m (39ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. It can tolerate atmospheric pollution.

kcakta Edible Parts: Leaves SeedEdible Uses: Seed - cooked. The seed is roasted, dehusked, soaked until soft then boiled and eaten with sugar[179]. The seed contains 22.4% protein and 2.8% fat[218]. Young leaves - cooked[105]. A famine food used when all else fails[177].

tcanta SoapA soap is obtained from the pulp contained in the seedpods[11, 46, 61, 174]. It is obtained from the seed according to another report[105]. Wood - strong, durable, coarse-grained[82].

dwatta Antitussive Astringent Expectorant Haemostatic Skin VDAntitussive, astringent, expectorant, haemostatic, skin[174]. Treats syphilitic skin diseases[174].

nrakta E. Asia - Japan. ksacta Damp sandy soils[200]

propta Seed - pre-soak for 24 hours in warm water and then sow in spring in a greenhouse[78]. The seed should have swollen up, in which case it can be sown, if it has not swollen then soak it for another 24 hours in warm water. If this does not work then file away some of the seed coat but be careful not to damage the embryo[78]. Further soaking should then cause the seed to swell. One it has swollen, the seed should germinate within 2 - 4 weeks at 20°C. As soon as they are large enough to handle, prick the seedlings out into individual deep pots and plant them out into their permanent positions in the summer. Give the plants some protection from the cold for their first few winters outdoors.

nwatta Easily grown in a loamy soil, requiring a sunny position[11]. Succeeds in most soils[200]. Tolerates drought once established[1] and atmospheric pollution[200]. A rather tender plant, especially when young, it is seen at its best in southern Britain[11]. Older trees, however, are completely hardy in Britain[11]. Trees at Kew produced lots of pods and fertile seeds in the hot summer of 1989, they also fruited well in the cool summer of 1993 and also in 1994, 95 and 96[K]. Trees are cultivated for their seedpods in Japan[61]. Trees have a light canopy, they come into leaf late in the spring and drop their leaves in early autumn[200] making them an excellent canopy tree for a woodland garden. Plants in this genus are notably resistant to honey fungus[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

6.1.8 Myrica heterophylla

Bayberry

tfo2n 5 tlin 9 cyuc 3 kcak 3 tcan 2 dwat 3 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7ti flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Myrica heterophylla is an evergreen Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower in May, and the seeds ripen in September. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

pcista Although no reports of toxicity have been seen for this species, there is a report for some members of this genus that some of the constituents of the wax might be carcinogenic[222].

kcakta Edible Parts: FruitEdible Uses: Condiment TeaThe following notes are for the closely related M. cerifera. It is assumed that they also apply to this species[K]. Fruit - raw or cooked[105, 177, 183]. The fruit is about 2 - 4mm in diameter with a single large seed[200]. There is very little edible flesh and this is of poor quality[K]. Leaves and berries are used as a food flavouring[62, 105, 177]. An attractive and agreeable substitute for bay leaves, used in flavouring soups, stews etc[183]. The dried leaves are brewed into a robust tea[183].

tcanta Dye Hedge Hedge Wax WoodThe following notes are for the closely related M. cerifera. It is assumed that they also apply to this species[K]. A wax covering on the fruit is extracted by scalding the fruit with boiling water and immersing them for a few minutes, the wax floats to the surface and is then skimmed off. The fruit is then boiled in water to extract the wax from the pulp and once more the wax is skimmed off. It is then strained through a muslin cloth and can be used to make aromatic candles, sealing wax etc[1, 4, 6, 11, 62, 95, 171, 245]. Candles made from this wax are quite brittle but are less greasy in warm weather[213]. They are slightly aromatic, with a pleasant balsamic odour[245], and do not smoke when put out, making them much more

pleasant to use that wax or tallow candles[213]. The wax is also used in making soaps[213]. About 1 kilo of wax can be obtained from 4 kilos of berries[4]. A blue dye is obtained from the fruit[6]. The plant can be grown as an informal hedge[200], succeeding in windy sites[K]. Wood - light, soft, brittle, fine-grained[82, 227]. The wood weighs 35lb per cubic foot[227]. It is of no commercial value[229].

dwatta Astringent Dysentery Emetic Stimulant TonicThe following notes are for the closely related M. cerifera. It is assumed that they also apply to this species[K]. The root bark is astringent, emetic (in large doses), stermutatory, stimulant and tonic[4, 21, 46, 165, 213]. It is harvested in the autumn, thoroughly dried and powdered and kept in a dark place in an airtight container[4]. It is used internally in the treatment of diarrhoea, jaundice, fevers, colds, influenza, catarrh, excessive menstruation, vaginal discharge etc[4, 238]. Externally, it is applied to indolent ulcers, sore throats, sores, itching skin conditions, dandruff etc[4, 238]. The wax is astringent and slightly narcotic[4]. It is regarded as a sure cure for dysentery and is also used to treat internal ulcers[4]. A tea made from the leaves is used in the treatment of fevers and externally as a wash for itchy skin[222].

nrakta Southeastern N. America - New Jersey to Florida, west to Louisiana. ksacta Bogs, stream, pond and lake margins, moist regions of mixed deciduous forests, pine flatlands near pitcher-plant bogs, swamps from sea level to 250 metres[270].

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

nwatta Prefers a moist soil[200]. Grows well in an open position in a well-drained soil in sun or light shade[200]. Thrives in any ordinary garden soil according to one report[11] whilst another says that it thrives in an acid soil[182]. Prefers a lime-free loamy or peaty soil[1]. Succeeds in dry and maritime climates[200]. Closely related to M. pensylvanica and M. cerifera[200]. Dioecious, male and female plants must be grown if seed is required. Plants in this genus are notably resistant to honey fungus[200]. Many species in this genus have a symbiotic relationship with certain soil micro-organisms, these form nodules on the roots of the plants and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

6.1.9 Glycyrrhiza uralensis

Gan Cao

tfo2n 5 tlin 9 cyuc 3 kcak 3 tcan 4 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7ti flatpriklwis hpa7tmwatli xre7t hjonli

drutta Glycyrrhiza uralensis is a PERENNIAL growing to 0.6 m (2ft) by 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to August, and the seeds ripen from July to October. The species is hermaphrodite (has both male and female organs). It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: SweetenerThe fibrous root is used as a sweetener for foods[183]. It is boiled in water to extract the sugars etc and used as a liquorice substitute in sweets, medicines, drinks etc[74, 174, 177]. The root contains glycyrrhizin, which is 50 times sweeter than sugar[218].

tcanta Fire retardant InsulationLiquorice root, after the medicinal and flavouring compounds have been removed, is used in fire extinguishing agents, to insulate fireboards and as a compost for growing mushrooms[218]. Nitrogen fixer. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

6.1.16 Sophora davidii

Sophora

tfo2n 5 tlin 8 cyuc 1 kcak 0 tcan 0 dwat 2.5 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7ti flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Sophora davidii is a deciduous Shrub growing to 2.5 m (8ft) by 2.5 m (8ft) at a slow rate. It is in flower from June to July, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs). It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil.

pcista The plant contains cytosine, which resembles nicotine and is similarly toxic[238].

kcakta Edible Parts: FlowersEdible Uses: Flowers[177, 183]. No further details are given.

nrakta E. Asia - China in W. Hubei, W. Sichuan and Yunnan. ksacta Dry rocky places and arid valleys, often covering large areas[109].

propta Seed - best sown as soon as it is ripe in a greenhouse[200]. Pre-soak stored seed for 12 hours in hot (not boiling) water and sow in late winter in a greenhouse[78]. Prick out the seedlings as soon as they are large enough to handle into individual pots in the greenhouse, and grow them on for 2 years under protected conditions. Plant them out into their permanent positions in early summer of their third year. Cuttings of young shoots with a heel, July/August in a frame[11]. Air-layering[200].

nwatta Landscape Uses:Specimen. Succeeds in a sunny position in most dry or moist well-drained soils[184]. Requires a good loamy soil[11]. Grows well on chalk[184]. It grows best in the warmer areas of the country where the wood will be more readily ripened and better able to withstand winter cold[219]. Hardy to about -20°C but requires the extra warmth of a wall if it is to flower well[184]. However, a free-standing shrub at Kew is growing very well[184]. A very ornamental plant[1]. Plants should be container-grown and planted out whilst young, older plants do not transplant well[219]. Plants in this genus are notably resistant to honey fungus[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. Special Features: Not North American native, Fragrant flowers, Attractive flowers or blooms.

6.1.17 Lathyrus latifolius

Perennial Sweet Pea, Perennial pea

tfo2n 5 tlin 9 cyuc 1 kcak 2 tcan 0 dwat 2 m hkuc hmimhtut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7ti flatpriklwis hpa7tmwatli xre7t hjonli

drutta Lathyrus latifolius is a PERENNIAL CLIMBER growing to 2 m (6ft) by 2 m (6ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

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

kcakta Edible Parts: Leaves Seed SeedpodEdible Uses: Seed - cooked[105, 177]. Some caution is advised, see the notes above on toxicity. Young seedpod - cooked[105, 177]. Young plant - cooked[105, 177].

tcanta Plants can be grown without supports when they will sprawl on the ground and can be used as a ground cover plant in a sunny position[188, 202]. They should be spaced

about 1.5 metres apart each way[208]. They are very vigorous and so are best not used with small plants[K]. They also die down completely in the winter, giving weeds a chance to become established[K].

nrakta S. Europe. Occasionally naturalized in Britain. ksacta Hedges, vineyards, fields and uncultivated places[50].

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

nwatta Landscape Uses:Arbor, Container. An easily grown plant, succeeding in any moderately good garden soil[200], whether acid or alkaline[202]. Prefers a position in full sun but tolerates part day shade[200]. Succeeds in dry soils and is drought tolerant when established[190]. Grows well on dry slopes[208]. Plants can be grown in quite coarse grass, which can be cut annually in the autumn[233]. Plants are hardy to at least -10°C[202]. A very ornamental plant[1], there are many named varieties[187]. It is fast-growing and, when in a suitable position, can become invasive[202]. Plants climb by means of tendrils[188]. Resents root disturbance and can take a year or two to settle down after being moved[219]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. Special Features:All or parts of this plant are poisonous, Suitable for cut flowers. The plant is heat tolerant in zones 9 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. Herbaceous. A suckering vine sending up suckers some distance main plant [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

6.1.18 Lathyrus davidii

tfo2n 5 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 1.2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7ti flatpriklwis hpa7tmwatli xre7t hjonli

drutta Lathyrus davidii is a PERENNIAL growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

kcakta Edible Parts: Flowers Leaves Seed SeedpodEdible Uses: Seed - cooked[105, 177]. Some caution is advised, see the notes above on toxicity. Young seedpod - cooked[105, 177]. Young plant, including the inflorescence - cooked and used as a potherb or added to soups etc[105, 177, 183].

nrakta E. Asia - northern China, Japan, Korea, Manchuria, Russia. ksacta Woods and thickets all over Japan[58]. Hill slopes, forest sides and bush-woods, usually at altitudes lower than 1800 metres in northern China[266].

propta Pre-soak the seed for 24 hours in warm water and then sow in early spring in a cold frame[200]. When they are

nwatta Landscape Uses: Erosion control. Prefers a heavy soil and a damp situation[1, 11]. Grows well in heavy clay soils[11]. Tolerates very infertile sites[200]. A fast-growing but short-lived tree[229]. There is some confusion over the correct name of this tree with one authority citing the European species *A. incana* as the correct name[60]. Another report says that this species is closely related to *A. incana*, but distinct[229]. Some modern works treat it as a subspecies (*Alnus incana tenuifolia*). This species has a symbiotic relationship with certain soil micro-organisms, these form nodules on the roots of the plants and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. Special Features:Not North American native, Wetlands plant, Inconspicuous flowers or blooms. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

6.1.15 Cytisus scoparius

Broom, Scotch broom, Common Broom
tfo2n 5 tlin 8 cyuc 1 kcaak 4 tcan 3 dwat 2.4 m hkuc
hmmihtut cyutli hgatkyutcup hwicli hyihshrasjlutnyk hpa7tli
frusflatprikliw hpa7tmwatli dyatre7t hjonli

drutta *Cytisus scoparius* is a deciduous Shrub growing to 2.4 m (7ft) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to June, and the seeds ripen from August to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is not self-fertile. It can fix Nitrogen. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure. It can tolerate atmospheric pollution.

pcista Poisonous[10, 19, 65]. The plant is of extremely low or zero toxicity[76].

kcakta Edible Parts: FlowersEdible Uses: Coffee CondimentThe flower buds are pickled and used as a substitute for capers[4, 46, 183, 244]. They can also be added to salads[183]. Some caution is advised, see the notes above on toxicity. The tender green tops of the plant have been used like hops to give a bitter flavour to beer and to render it more intoxicating[4, 183]. The roasted seed is a coffee substitute[2, 4, 115, 183].

tcanta Basketry Broom Dye Essential Fibre Paper Repellent Soil stabilization Tannin WoodAn excellent fibre is obtained from the bark, it is used in the manufacture of paper, cloth and nets[4, 100, 115]. It is not as strong as the fibre from the Spanish broom (*Spartium junceum*)[4]. The fibre is obtained from the root according to other reports[13, 46]. The bark fibre is used to make paper, it is 2 - 9mm long[189]. The branches are harvested in late summer or autumn, the leaves removed and the stems steamed until the fibres can be stripped. The fibres are cooked for 3 hours in lye then put in a ball mill for 3 hours. The paper is pale tan in colour[189]. The bark is a good source of tannin[4]. A yellow and a brown dye are obtained from the bark[46]. A yellow dye is obtained from the flowering stem[169]. A green dye is obtained from the leaves and young tops[4]. The branches are used to make baskets, brushes, brooms and besoms[4, 6, 13, 46, 55, 115]. They are also sometimes used for thatching roofs and as substitutes for reeds in making fences or screens[4]. An essential oil from the flowers is used in perfumery[57]. Growing well on dry banks and on steep slopes, it is an effective sand binder and soil stabiliser[4, 11, 46]. Broom is one of the first plant to colonize sand dunes by the coast[4]. The plant attracts insects away from nearby plants[14]. The var. *prostratus* (= *C. scoparius maritimus*?[208]) makes a good fast growing ground cover plant to 30cm tall, though it needs weeding in its first year[197]. The cultivar 'Andreanus Prostratus' can also be used[208]. Wood - very hard, beautifully veined[4]. The plant seldom reaches sufficient size for its

wood to be of much value, but larger specimens are valued by cabinet makers and for veneer[4].

dwatta Antiarrhythmic Antirheumatic Cardiotonic Cathartic Diuretic Emetic VasoconstrictorBroom is a bitter narcotic herb that depresses the respiration and regulates heart action[238]. It acts upon the electrical conductivity of the heart, slowing and regulating the transmission of the impulses[254]. The young herbaceous tips of flowering shoots are cardiotoxic, cathartic, diuretic, emetic and vasoconstrictor[4, 13, 21, 46, 165]. The seeds can also be used[4]. The plant is used internally in the treatment of heart complaints, and is especially used in conjunction with *Convallaria majalis*[238]. The plant is also strongly diuretic, stimulating urine production and thus countering fluid retention[254]. Since broom causes the muscles of the uterus to contract, it has been used to prevent blood loss after childbirth[254]. Use this herb with caution since large doses are likely to upset the stomach[4, 21]. The composition of active ingredients in the plant is very changeable, this makes it rather unreliable medicinally and it is therefore rarely used[9]. This herb should not be prescribed to pregnant women or patients with high blood pressure[238]. Any treatment with this plant should only be carried out under expert supervision[9]. See also the notes above on toxicity. The young herbaceous tips of flowering shoots are harvested in spring, generally in May[4]. They can be used fresh or dried[4, 238]. They should not be stored for more than 12 months since the medicinally active ingredients break down[238].

nrakta Europe, including Britain, from Scandinavia south to Spain, east to Poland and Hungary. ksacta Sandy pastures and heaths, occasionally in open woodland, and often near the coast[4, 17]. Strongly calcifuge[17].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame[80]. Pre-soak stored seed for 24 hours in warm water then cold stratify for 1 month and sow in a cold frame[80]. The seed usually germinates in 4 weeks at 20°C[98, 113]. Seedlings should be potted up as soon as possible since plants quickly become intolerant of root disturbance[186]. Plant them out into their permanent positions in late summer if they have made sufficient growth, otherwise in late spring of the following year[K]. The seed has a long viability[186]. Seed can also be sown in situ as soon as it is ripe in the late summer and autumn[4]. Cuttings of half-ripe wood, 4 - 7 cm with a heel, August in a frame[11]. Produces roots in the spring[11]. Pot up as soon as possible[11]. Cuttings of mature wood, October/November in a frame. Layering.

nwatta Agroforestry Services: Nitrogen Management: Coppice Minor Global CropLandscape Uses:Border, Container, Foundation, Massing, Specimen. Succeeds in most soils, preferring a fairly good but not rich soil[11]. Prefers a poor well-drained soil[14]. Succeeds in slightly acid, neutral and limy soils but dislikes shallow soils over chalk[200]. Plants are strongly calcifuge according to other reports and intolerant of a pH much above 6.5[17, 186]. Prefers a sunny position but tolerates some shade[11, 14, 17]. Plants succeed in exposed conditions, and are very tolerant of maritime exposure[4, K]. Plants have a deep root system, they are very drought tolerant once established and grow well on dry banks[4, 11]. Tolerates a smoky atmosphere, growing well in polluted areas[186]. Plants are hardy to about -20°C[184]. A number of named forms have been developed for their ornamental value[182]. New leaves are formed in April but these soon drop off the plant, photosynthesis being carried out by means of the green stems[186]. Very tolerant of cutting, it regenerates quickly from the base[186]. Plants are usually killed by fire but the seeds quickly germinate after the fire and rapidly become established[186]. A good bee plant and food plant for many caterpillars[24, 30, 46], it provides the food for the larvae of the green hairstreak butterfly[186]. Ants are attracted to the seeds, feeding on the juicy attachment that holds them to the pods and thus distributing the seed[186]. Dislikes root disturbance, especially when more than 20cm tall[11]. It is best to plant out into their permanent positions as early as possible. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. Special Features:Not North American native, Naturalizing, Fragrant flowers, Attractive flowers or blooms.

dwatta Antiphlogistic Antispasmodic Antitussive Cholagogue Emollient ExpectorantGan Cao is commonly used in Chinese herbalism, where it is considered to be one of the 50 fundamental herbs[218]. It is considered to be second in importance only to Ginseng (*Panax spp*) [218]. Used in excess, however, it can cause cardiac dysfunction and severe hypertension[218]. The root is a sweet tonic herb that stimulates the corticosteroidal hormones, neutralizes toxins and balances blood sugar levels[238]. It is also antibacterial, anti-inflammatory, antiphlogistic, antispasmodic, antitussive, cholagogue, demulcent, emollient, expectorant and laxative[61, 176, 218, 238]. It is used internally in the treatment of Addison's disease, asthma, coughs and peptic ulcers[238]. Externally, it is used to treat acne, boils and sore throats[238]. It is included in almost all Chinese herbal formulae, where it is said to harmonize and direct the effects of the various ingredients[238]. It precipitates many compounds and is therefore considered to be unsuitable for use with some herbs such as *Daphne genkwa*, *Euphorbia pekinensis* and *Corydalis solida*[238]. It increases the toxicity of some compounds such as ephedrine, salicylates, adrenaline and cortisone[238]. It should not be prescribed for pregnant women or for people with high blood pressure, kidney disease or anyone taking digoxin-based medications[238]. Excessive doses cause water retention and high blood pressure[238]. It can cause impotence in some people[238]. The roots are harvested in early autumn, preferably from plants 3-4 years old, and is dried for later use[238]. The flowers are alterative and expectorant[218].

nrakta E. Asia - China, Japan, Siberia. ksacta Meadows, riparian woodlands and solonchets slopes in Siberia, Mongolia, China and Japan[74].

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

nwatta Requires a deep well cultivated fertile moisture-retentive soil for good root production[200]. Prefers a sandy soil with abundant moisture[238]. Slightly alkaline conditions produce the best plants[238]. Plants are hardy to at least -15°C[238]. This species is widely cultivated in China as a medicinal plant. Unless seed is required, the plant is usually prevented from flowering so that it puts more energy into producing good quality roots[238]. A very deep-rooted plant, it can be difficult to eradicate once it is established[238]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. The plant is heat tolerant in zones 10 through 7. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

6.1.10 Trifolium pratense

Red Clover
tfo2n 5 tlin 9 cyuc 3 kcaak 4 tcan 3 dwat 0.6 m hkuc

htut cyutli tcup hwicli hyihshrasjlutnyk hpa7tli flatprikliw hpa7tmwatli xre7t hjonli

drutta *Trifolium pratense* is a PERENNIAL growing to 0.6 m (2ft) by 0.6 m (2ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from May to September, and the seeds ripen from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). It can fix Nitrogen. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

pcista Diseased clover, even if no symptoms of disease are visible, can contain toxic alkaloids[222].

kcakta Edible Parts: Flowers Leaves Root SeedEdible Uses: Condiment TeaLeaves and young flowering heads - raw or cooked[2, 55, 105, 183]. The young leaves are harvested before the plant comes into flower, and are used in salads, soups etc[9]. On their own they can be used as a vegetable, cooked like spinach[9].The leaves are best cooked[172]. They can be dried, powdered and sprinkled on foods such as boiled rice[183]. The leaves contain 81% water, 4% protein, 0.7% fat, 2.6% fibre and 2% ash[218]. The seed can be sprouted and used in salads. A crisp texture and more robust flavour than alfalfa (*Medicago sativa*) [183]. The seeds are reported as containing trypsin inhibitors[218]. These can interfere with certain enzymes that help in the digestion of proteins, but are normally destroyed if the seed is sprouted first. Flowers and seed pods - dried, ground into a powder and used as a flour[115]. The young flowers can also be eaten raw in salads[144, 172]. Root - cooked[172, 177]. A delicate sweet herb tea is made from the fresh or dried flowers[21, 55, 183]. The dried leaves impart a vanilla flavour to cakes etc[172].

tcanta Dye Green manure Miscellany Soil reclamationA yellow dye is obtained from the flowers[46, 61]. The plant makes a good green manure, it is useful for over-wintering, especially in a mixture with *Lolium perenne*[54]. Deep rooting, it produces a good bulk[87]. It is a host to 'clover rot' however, so should not be used too frequently[87]. It can be undersown with cereals though it may be too vigorous[87]. It is also grown with grass mixtures for land reclamation, it has good nitrogen fixing properties[200]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Alterative Antipsoriatic Antiscrophulatic Antispasmodic Aperient Cancer Detergent Diuretic Eczema Expectorant Miscellany Sedative Skin TonicRed clover is safe and effective herb with a long history of medicinal usage. It is commonly used to treat skin conditions, normally in combination with other purifying herbs such as *Arctium lappa* and *Rumex crispus*[254]. It is a folk remedy for cancer of the breast, a concentrated decoction being applied to the site of the tumour in order to encourage it to grow outwards and clear the body[254]. Flavonoids in the flowers and leaves are oestrogenic and may be of benefit in the treatment of menopausal complaints[254]. The flowering heads are alterative, anticorfulous, antispasmodic, aperient, detergent, diuretic, expectorant, sedative and tonic[4, 21, 165, 218, 238]. It has also shown anticancer activity[172, 218], poultices of the herb have been used as local applications to cancerous growths[54]. Internally, the plant is used in the treatment of skin complaints (especially eczema and psoriasis), cancers of the breast, ovaries and lymphatic system, chronic degenerative diseases, gout, whooping cough and dry coughs[238]. The plant is normally harvested for use as it comes into flower[222, 238] and some reports say that only the flowers are used[4]. The toxic indolizidine alkaloid 'slaframine' is often found in diseased clover (even if the clover shows no external symptoms of disease). This alkaloid is being studied for its antidiabetic and anti-AIDS activity[222].

nrakta Europe, including Britain, from Norway south and east to Spain and W. Asia. ksacta Meadows, pastures and other grassy places[9], especially on calcareous soils. Usually found on circumneutral soils[17].

propta Pre-soak the seed for 12 hours in warm water and then sow in spring in situ. If the seed is in short supply it might be better to sow it in pots in a cold frame. When

they are large enough to handle, prick the seedlings out into individual pots and plant them out in late spring. Division in spring[238].

nwatta Succeeds in a moist, well-drained circum-neutral soil in full sun[200]. Prefers a medium-heavy loam[87]. A short-lived perennial[200]. A very hardy plant, tolerating temperatures down to at least -23°c[238]. A very important food plant for the caterpillars of many butterfly and moth species[30]. It is also a good bee plant[54], but not so valuable as the white clover, *T. repens*[4]. It grows well in an apple orchard, the trees will produce tastier fruit that stores better[201]. It should not be grown with camellias or gooseberries because it harbours a mite that can cause fruit drop in the gooseberries and premature budding in the camellias[201]. Very polymorphic, there are many subspecies and varieties. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. Buttercups growing nearby depress the growth of the nitrogen bacteria by means of a root exudate[201]. The plant is heat tolerant in zones 9 through 6. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

6.1.11 Indigofera tinctoria

Indigo, True Indigo, dye indigo
tfo2n 5 tlin 12 cyuc 2 kcaak 4 tcan 2 dwat 2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli hjonli

drutta Indigofera tinctoria is a deciduous Shrub growing to 2 m (6ft) by 2 m (6ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: ColouringThe deep blue dye obtained from the leaves is sometimes used to counteract the slightly yellow colour of icing sugar[301].

tcanta Dye Green manure Insecticide Soil conditioner TeethAgroforestry Uses: The plant is sometimes grown as a cover crop and green manure[418]. Indigofera tinctoria is useful as a green manure, it is used in India, for example, in coffee plantations and as a cover crop preceding rice, maize, cotton and sugarcane[299]. In traditional rainfed rice cropping systems in the Philippines, this plant is a popular green manure, increasing rice yield whilst also reducing by 50% the need to supply expensive nitrogen fertilizer[299]. The residue remaining after indigo extraction is also applied to the land as manure[299]. Another reason to grow Indigofera tinctoria as a green manure is because it is a good nitrogen catch crop, reducing the amount of fertilizer NO3 leaching to the groundwater[299]. Other Uses: A deep blue dye is obtained from the leaves[46 , 299 , 301]. The leaves and twigs do not actually contain indigo but colourless precursors that must be extracted and then processed in order to produce the indigo dye[299]. The harvested leafy branches are placed in a tank containing water to which some lime has been added, and are weighted down with planks[303]. After some hours of fermentation, during which enzymic hydrolysis leads to the formation of indoxyl, the liquid is drained off and then stirred continuously for several hours to stimulate oxidation of the indoxyl[303]. Afterwards the solution is left to rest and the insoluble indigo settles to the bottom as a bluish sludge[303]. The water is drained and after the

indigo has dried, it is cut into cubes or made into balls[303]. To dye textiles, indigo is reduced to a soluble form by a fermentation process under alkaline conditions. In traditional preparations of the dye, various reducing agents such as molasses are used, together with coconut-milk, bananas and the leaves of *Psidium guajava*[303]. The alkalinity is maintained by adding lime. After the textile has been dipped into solution it turns blue when exposed to the air[303]. The twigs are used as toothbrushes[299].

dwatta Antiasthmatic Antihæmorrhoidal Epilepsy Febrifuge Kidney Mouthwash Skin Stings StomachicA leaf infusion (sometimes combined with honey or milk) is used to treat a range of disorders including epilepsy and nervous disorders; asthma and bronchitis; fever; complaints of the stomach, liver, kidney and spleen; and as a rabies prophylactic[299]. Applied externally, the leaves are made into an ointment for treating skin diseases, wounds, sores, ulcers and hæmorrhoids[299]. A tincture of the seed is used in India to kill lice[299]. A root preparation is applied to relieve toothache, sypihlis, gonorrhoea and kidney stones[299]. A watery root paste is applied topically in India to treat worm-infested wounds[299]. A root infusion is used there as an antidote against snakebites and to treat insect and scorpion stings[299].

nrakta Probably originally from Malaysia, the plant now has a pantropical distribution. ksacta Not known

propta Seed - pre-soak overnight in warm water and sow in a seedbed with partial shade. Germination takes about 4 days[299]. Semi-ripe cuttings of lateral shoots with a heel[200]. Root cuttings.

nwatta Agroforestry Services: Nitrogen Industrial Crop: Dye Management: Coppice Minor Global CropA plant of the tropics and subtropics, where it is found at elevations up to 1,600 metres. It grows best in areas where annual daytime temperatures are within the range 22 - 28°, but can tolerate 7 - 32°c[418]. It prefers a mean annual rainfall in the range 1,300 - 1,700mm, but tolerates 640 - 3,000mm[418]. Requires a position in full sun, succeeding in any deep, well-drained and moderately retentive and fertile soil[200]. Prefers a pH in the range 6 - 7, tolerating 4.3 - 8.7[418]. Requires a position sheltered from hot winds[418]. Branches are harvested by cutting 10 - 20cm above ground level when the plants are 4 - 5 months old and have formed a closed stand, usually at the flowering stage[299]. The crop should be harvested promptly because heavy rains or flooding can destroy it in a few hours. In India harvested branches are tied into bundles of about 130 kg and transported to the dye factory. Up to 3 harvests are possible per year[299]. Dye yields can be 1.6 - 5.4 tonnes per hectare[418]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[755]. Flowering Time: Mid Spring. Bloom Color: Red-Orange or Pink. Spacing: 36-48 in. (90-120 cm).

6.1.12 Ononis spinosa

Spiny Rest Harrow
tfo2n 5 tlin 9 cyuc 2 kcaak 3 tcan 2 dwat 0.6 m hkuc htut cyutli kyuctcup hwicli hyishrasjlutnyik hpa7tli flatprikliwissiip hpa7tmwatli xre7t hjonli

drutta Ononis spinosa is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Young shoots - cooked[2, 105]. Used as a potherb[183]. Roots - chewed for their liquorice-like flavour[183]. Flowers - raw. They are used as a decoration on salads[7].

tcanta Nitrogen Fixer

dwatta Antirheumatic Antitussive Aperient Diuretic LithotropicThe roots, leaves and flowers are antitussive, aperient, diuretic and lithotropic[7, 9, 13, 21, 46]. The root

contains a fixed oil that is anti-diuretic and an essential oil that is diuretic. If the diuretic action is required then the root should be infused and not decocted or the essential oil will be evaporated[254]. An infusion is used in the treatment of dropsy, inflammation of the bladder and kidneys, rheumatism and chronic skin disorders[9]. The roots are used occasionally, they are harvested in the autumn, cut into slices and carefully dried for later use[9]. The young shoots are more commonly used, either fresh or dried[9]. They can be harvested throughout the summer[9]. A cough mixture is made from the bark[13].

nrakta Most of Europe, including Britain, to N. Africa and temperate Asia. ksacta Chalk and limestone grassland, stony hillsides and open pine forests[187], mainly on dry stony ground[7].

propta Scarify or pre-soak the seed for 24 hours in warm water and sow the seed in the middle of spring in situ[200]. The seed can also be sown in a cold frame in the autumn. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in late spring[200]. Division just before new growth begins in spring[200]. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer. Cuttings, September in a cold frame[111].

nwatta Prefers a sunny position in a well-drained neutral to alkaline soil[200]. Succeeds in poor soils, the plant often becoming spiny in such a situation[17]. Similar to *O. repens* but this species is not rhizomatous[200]. Mature roots are very tough and the plant gained its common name of 'Rest Harrow' because ploughs and harrows would be unable to break through it (in the days before heavy machinery was used on the land!). The whole plant is pleasantly scented when bruised[245]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

6.1.13 Ononis repens

Rest Harrow, Common restharrow
tfo2n 5 tlin 9 cyuc 2 kcaak 0 tcan 1 dwat 0.6 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Ononis repens is a PERENNIAL growing to 0.6 m (2ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Leaves RootEdible Uses: Drink-Root - raw or cooked. A liquorice substitute[5, 66]. Soaked in cold water it makes a refreshing cold drink[66]. The young shoots were at one time much used as a vegetable, being boiled, pickled or eaten in salads[4].

dwatta LithotropicThe whole herb has been used in the treatment of bladder stones and to subdue delirium[4].

nrakta Western Europe in Britain, France and Belgium. ksacta Dry grassland on calcareous soils[5, 17].

propta Scarify or pre-soak the seed for 24 hours in warm water and sow the seed in the middle of spring in situ[200]. The seed can also be sown in a cold frame in the autumn. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in late spring[200]. Division just before new growth begins in spring[200]. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer. Cuttings, September in a cold frame[111].

nwatta Prefers a sunny position in a well-drained neutral to alkaline soil[200]. Succeeds on the tops of walls and on

dry banks[200]. Similar to *O. spinosa*, but this species is rhizomatous[200]. It can spread rapidly when well sited[1] and has become an obnoxious weed in some areas[245]. Mature roots are very tough and the plant gained its common name of 'Rest Harrow' because ploughs and harrows would be unable to break through it (in the days before heavy machinery was used on the land!). The whole plant emits a delicious resinous odour when bruised[245]. A food plant for the common blue butterfly[200]. Dislikes root disturbance[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

6.1.14 Alnus tenuifolia

Mountain Alder, Thinleaf alder
tfo2n 5 tlin 7 cyuc 1 kcaak 0 tcan 2 dwat 9 m hkuc hmimhtut cyutli tcuphja7n hwicli hysjlitnyikfriip hpa7tli flatprikliwis hpa7tmwatli hjonli

drutta Alnus tenuifolia is a deciduous Tree growing to 9 m (29ft 6in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 2. It is in flower in March, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. It can fix Nitrogen. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

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

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

tcanta Pioneer Soil stabilization Tannin WoodThis is an excellent pioneer species for re-establishing woodlands on disused farmland, difficult sites etc[226]. Its fast rate of growth means that it quickly provides sheltered conditions to allow more permanent woodland trees to become established. In addition, bacteria on the roots fix atmospheric nitrogen - whilst this enables the tree to grow well in quite poor soils it also makes some of this nitrogen available to other plants growing nearby. Alder trees also have a heavy leaf canopy and when the leaves fall in the autumn they help to build up the humus content of the soil. Alder seedlings do not compete well in shady woodland conditions and so this species gradually dies out as the other trees become established[K]. The tree has an extensive root system and can be planted to control banks from erosion[226]. The bark and the strobils are a source of tannin[82]. A dark dye is obtained from the bark[226]. The colour can range from orange through red to brown[257]. Wood - soft, straight-grained, very durable in water[82]. It is of no commercial value, though it is used locally as a fuel[229].

dwatta Anodyne Astringent Emetic Febrifuge Haemostatic Stomachic TonicThe bark is astringent, emetic, haemostatic, stomachic and tonic[172]. The bark also contains salicin[226], which probably decomposes into salicylic acid (closely related to aspirin) in the human body[213]. This is used as an anodyne and febrifuge[226]. The outer bark is astringent and is applied as a poultice to bleeding wounds, it also reduces swellings[226].

nrakta Western N. America - Alaska to California and New Mexico. ksacta Moist soils by swamps, streams, ponds and lakes in foothills to well up in the mountains[60, 229].

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

dwatta Antispasmodic Diaphoretic SedativeA tea made from the flowers is antispasmodic, diaphoretic and sedative[226].

nrakta E. Asia - China, Japan. ksacta Thickets and woods, 1300 - 2600 metres in W. Hupeh[109].

propta Seed - much of the seed produced in Britain is not viable, cut a few seedcases open to see if there is a seed inside[80]. If possible, obtain fresh seed that is ripe but has not as yet developed a hard seed coat and sow it immediately in a cold frame. It may germinate in the following spring though it could take 18 months[80]. Stored seed can be very slow to germinate. It has a hard seed coat, embryo dormancy and a hard coat on the pericarp. All these factors mean that the seed may take up to 8 years to germinate[80]. One way of shortening this time is to stratify the seed for 5 months at high temperatures (10°c at night, up to 30°c by day) and then 5 months cold stratification[80]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Layering in spring just before the leaves unfurl. Takes 1 - 3 years[78]. Suckers, when formed, can be removed with as much root as possible during the dormant season and replanted immediately[200].

nwatta Prefers a good moist loamy alkaline to neutral soil but succeeds on slightly acid soils[11, 200]. Grows poorly on any very dry or very wet soil[200]. Dislikes exposed positions[200]. Succeeds in sun or semi-shade[188]. Prefers a continental climate, growing more slowly and not producing fertile seed in areas with cool summers[200]. Lime trees tend to hybridise freely if other members of the genus are growing nearby[238]. If growing plants from seed it is important to ensure the seed came from a wild source or from an isolated clump of the single species[K]. Grows best in a woodland situation, young plants tolerate a reasonable level of shade[200]. A good bee plant[125]. Unlike most other members of this genus, this species does not usually become infested with aphids[125]. Quite tolerant of root disturbance, semi-mature trees up to 5 metres tall have been transplanted successfully. Plants in this genus are notably resistant to honey fungus[200].

6.2.78 Vitis monticola

Sweet Mountain Grape

5 tlin 9 cyuc 3 kcaok 0 tcan 0 dwat m hkuc hmimhtut cyutli kyucctup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Vitis monticola is a deciduous Climber growing to 10 m (32ft 10in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to July, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit - raw or dried for winter use[1, 2, 105]. Large, thin-skinned with a tender juicy sweet pulp[183]. Small and sweet according to another report[182]. The fruit is about 12mm in diameter[200] and is borne in bunches. Leaves - cooked[55]. Young leaves are wrapped around other foods and then baked, they impart a pleasant flavour. Young tendrils - raw or cooked[55, 85].

tcanta DyeA yellow dye is obtained from the fresh or dried leaves[168].

nrakta Southern N. America - S.W. Texas. ksacta Rich damp woodland soils[200]. Stream bottoms and limestone areas[274].

propta Seed - best sown in a cold frame as soon as it is ripe[K]. Six weeks cold stratification improves the germination rate, and so stored seed is best sown in a cold frame as soon as it is obtained. Germination should take place in the first spring, but sometimes takes another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant out in early summer. Cuttings of mature wood of the current seasons growth, December/January in a

frame. These cuttings can be of wood 15 - 30cm long or they can be of short sections of the stem about 5cm long with just one bud at the top of the section. In this case a thin, narrow strip of the bark about 3cm long is removed from the bottom half of the side of the stem. This will encourage callusing and the formation of roots. Due to the size of these cuttings they need to be kept in a more protected environment than the longer cuttings. Layering.

nwatta Prefers a deep rich moist well-drained moderately fertile loam[1, 200]. Grows best in a calcareous soil[200]. Succeeds in sun or partial shade though a warm sunny position is required for the fruit to ripen[200]. Plants climb by means of tendrils[182]. They grow especially well up elm trees[18]. Any pruning should be carried out in winter when the plants are dormant otherwise they bleed profusely[182, 200]. Plants in this genus are notably susceptible to honey fungus[200].

6.2.79 Plantago maritima

Sea Plantain, Goose tongue, California goose tongue

5 tlin 9 cyuc 3 kcaok 2 tcan 2 dwat m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwshsom hpa7tmwatli fyfxre7t hjonli

drutta Plantago maritima is a PERENNIAL growing to 0.2 m (0ft 8in) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from June to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in saline soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Leaves SeedEdible Uses: Young leaves - raw or cooked[2, 61, 105, 183]. A delicious flavour[172]. This is one of the nicer-tasting members of the genus, the leaves are fairly low in fibres and make an acceptable addition to a mixed salad[K]. The leaves are canned for winter use in Alaska[183]. Seed - raw or cooked. The seed can be ground into a powder and used as a flour extender[172]. The seed is very small and tedious to harvest[172].

tcanta An important food plant for the caterpillars of many species of butterflies[30]. Dynamic accumulator.

dwatta LaxativePlantain seeds contain up to 30% mucilage which swells up in the gut, acting as a bulk laxative and soothing irritated membranes[238]. Sometimes the seed husks are used without the seeds[238].

nrakta Western Europe, including Britain, from Scandinavia south and east to Spain, Hungary and Russia. ksacta Short turf in salt marshes near the sea and by streams in mountains, usually in saline or wet soils[17].

propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in early summer. A sowing can be made outdoors in situ in mid to late spring if you have enough seeds.

nwatta Succeeds in any moderately fertile soil in a sunny position[200].

6.2.80 Hydrangea macrophylla

French hydrangea , Florist's Hydrangea, Bigleaf Hydrangea 5 tlin 9 cyuc 3 kcaok 3 tcan 2 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatprikliwis hpa7tmwatli xre7t hjonli

drutta Hydrangea macrophylla is a deciduous Shrub growing to 3 m (9ft) by 3 m (9ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

mild onion flavour and are an excellent addition to mixed salads, they can also be used as a flavouring in soups etc[2, 4, 5, 9, 27, 33]. The leaves are often available from late winter and can continue to produce leaves until early the following winter, especially if they are in a warm, sheltered position[K]. A good source of sulphur and iron[201]. A nutritional analysis is available[218]. The bulbs are rather small, and rarely exceed 10mm in diameter[200]. They can be harvested with the leaves still attached and be used as spring onions[K]. They have a pleasant mild onion flavour. The flowers can be used as a garnish in salads etc[183]. The flowers of this species are rather dry and less desirable than the flowers of many other species[K].

tcanta Fungicide RepellentLandscape Uses: Border, Container, Massing, Rock garden, Forest Garden. The juice of the plant is used as an insect repellent, it also has fungicidal properties and is effective against scab, mildew etc[14, 18, 20, 201]. The growing plant is said to repel insects and moles[14, 20, 200]. Dynamic accumulator. Ground cover:nectary, Ground Cover. Aromatic.

dwatta Appetizer Digestive Hypotensive TonicThe whole plant has a beneficial effect on the digestive system and the blood circulation. It improves the appetite, is digestive, hypotensive and tonic[201]. It has similar properties to garlic (A. sativum), but in a much milder form, and it is rarely used medicinally[238].

nrakta Most of Europe, including Britain, east to the Himalayas and Japan. ksacta Rocky pastures and damp meadows, preferring calcareous soils[17, 90].

propta Seed - sow spring in a cold frame. Germination is usually free and easy, pot up the seedlings as soon as they are large enough to handle easily and plant out in the following spring. Division can be carried out at almost any time of the year but is probably best done in spring. The clumps should be divided at least every 3 or 4 years in order to maintain vigour[200], the divisions can be planted out direct into their permanent positions.

nwatta An easily grown plant[203], it prefers a sunny position in a rich moist but well-drained soil[14, 37], though it succeeds in moist soils[1, 37, 200] and also in light shade[203]. Grows well in heavy clay soils[203]. Tolerates a pH in the range 5.2 to 8.3. Chives are commonly cultivated in the garden for their edible leaves which are available from late winter to the beginning of the following winter[K]. The bulbs divide rapidly and large clumps are quickly formed. There are some named varieties[183, 200, 203]. Chives are very tolerant of heavy harvesting, regular cutting of the leaves ensures a continuous supply of young leaves and prevents the plants flowering[33]. Plants can be moved into a frame or other protected environment in the autumn and will then produce leaves throughout the winter[33]. Do not do this every year or it weakens the plants. The bulbs should be planted fairly deeply[1]. A good bee plant[24]. Grows well with most plants, especially roses, carrots, beet and chamomile, but it inhibits the growth of legumes[18, 20, 54]. Helps to reduce the incidence of scab when it is grown under apple trees[201]. This plant is a bad companion for alfalfa, each species negatively affecting the other[201]. Members of this genus are rarely if ever troubled by browsing deer[233]. Special Features: North American native, Edible, Fragrant foliage, Invasive, Naturalizing, Attracts butterflies, Suitable for cut flowers, Suitable for dried flowers, Fragrant flowers. The plant is heat tolerant in zones 12 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is a bulb.

6.2.17 Carya illinoensis

Pecan

5 tlin 9 cyuc 4 kcaok 2 tcan 1 dwat 50 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatprikliwsslip hpa7tmwatli fyif hjonli

drutta Carya illinoensis is a deciduous Tree growing to 50 m (164ft 1in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf from June to October, in flower from April to May, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Leaves Oil SeedEdible Uses: Milk Oil TeaSeed - raw or cooked[46, 82]. Sweet and delicious, they make an excellent dessert and are also often added to ice cream, used in cakes, bread etc[149, 183]. A milk can be made from the seed and is used to thicken soups, season corn cakes, hominy etc[183]. The seed is up to 4cm long and is produced in clusters of 3 -11[82, 229]. The seed ripens in late autumn and, when stored in its shell in a cool place, will keep for at least 6 months[K]. An edible oil is obtained from the seed[177, 183]. The leaves are said to be used as a tea[177, 183]. Carbon farming - Staple Crop: oil.

tcanta Fuel Oil Parasiticide WoodWood - coarse-grained, hard, heavy, brittle, not strong. It weighs 45 lb. per cubic foot. It is not as valuable a timber as other members of this genus and is used mainly for fuel and occasionally to make wagons and agricultural implements[46, 82, 227, 235]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve much.

dwatta Astringent Parasiticide TBThe bark and leaves are astringent[227]. A decoction of the bark has been used to treat TB[257]. The pulverized leaves have been rubbed on the skin to treat ringworm[257].

nrakta Southern N. America - mainly along the Mississippi river valley. ksacta Rich moist soils of bottomlands[229], especially along the sides of streams[235].

propta Seed - requires a period of cold stratification. It is best sown in a cold frame as soon as it is ripe[78]. Stored seed should be kept moist (but not wet) prior to sowing and should be sown in a cold frame as soon as possible[78]. Where possible, sow 1 or 2 seeds only in each deep pot and thin to the best seedling. If you need to transplant the seedlings, then do this as soon as they are large enough to handle, once more using deep pots to accommodate the tap root. Put the plants into their permanent positions as soon as possible, preferably in their first summer, and give them some protection from the cold for at least the first winter[78, K]. Seed can also be sown in situ so long as protection is given from mice etc and the seed is given some protection from cold[200] (a plastic bottle with the top and bottom removed and a wire mesh top fitted to keep the mice out is ideal)

nwatta Global Crop Management: Standard Other Systems: Strip intercrop Staple Crop: OilLandscape Uses:Aggressive surface roots possible. Prefers a deep moisture-retentive loam in a sunny sheltered position, requiring a good summer for best development[1, 63, 137, 200]. Tolerates a pH in the range 4.5 to 8.3. Trees are fairly fast growing[200]. Trees do not grow very well in Britain, requiring hotter summers than are normally experienced here in order to fruit and fully ripen their wood[200]. However, a tree at Cambridge botanical gardens was 20 metres tall in 1985. Trees are said to be hardy to about -12°C, the same report also says that they are hardy to zone 5[200], which would experience considerably lower temperatures than this. Trees are probably much harder when grown in areas with hot summers. In the wild, trees grow best in areas where summer temperatures average 24 - 30°C and the humidity is high[229]. Often cultivated for its edible seed, there are some named varieties[183]. Trees come into bearing when about 20 years old, the best period of production being between the ages of 75 to 225 years old[229]. Mature trees regularly give yields of 225 kilos, whilst yields of 450 kilos have been recorded[229]. A number of cultivars have been developed in N. America that succeed quite far north

in that country[200]. These cultivars include:- 'Carlson 3'. Early maturing, it is being trialled in Canada[183]. 'Devore'. An early fruiting form with small nuts that have an excellent flavour[183]. 'Gibson'. Precocious, protandrous, the nuts are of medium size with a good flavour[183]. 'Green Island'. Amongst the hardest of cultivars, it has been selected for nut size, flavour and productivity[183]. 'Mullaly'. Hardy, precocious and very productive, it has ripened in Ontario[183]. Nuts are fairly large with an excellent flavour. 'Voiles 2'. Usually ripens as far north as Ontario and New York[183]. The wind-blown pollen is a significant cause of hay fever in the United States[274]. This species is the State Tree of Texas[274]. Plants are strongly tap-rooted and should be planted in their permanent positions as soon as possible[1, 137]. Sowing in situ would be the best method so long as the seed could be protected from mice[1, 200]. Trees are late coming into leaf (usually late May to June) and lose their leaves early in the autumn (usually in October)[137]. During this time they cast a heavy shade. These factors combine to make the trees eminently suitable for a mixed woodland planting with shrubs and other trees beneath them[137]. Plants in this genus are notably resistant to honey fungus[200]. Most species in this genus have quite a wide range of distribution and, in order to find trees more suited to this country, seed from the most appropriate provenances should be sought[137]. Most trees growing in Britain at present tend to only produce good seed after hot summers[137]. Trees are self-fertile but larger crops of better quality seeds are produced if cross-pollination takes place[229]. Special Features:North American native. Inconspicuous flowers or blooms. Carbon Farming - Climate: cold temperate subtropical, tropical highlands. Humidity: humid. Cultivation: global crop. Management: standard. Other Systems: strip intercrop. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

6.2.18 Quercus frainetto

Hungarian Oak, Italian Oak, Forest Green Oak
5 tin 8 cyuc 4 kcaak 0 tcan 2 dwat 30 m hkc
hmimhtut cyutli tcup hwicli jlutnyik hpa7tli flatprklwis hpa7tmwatli hjonli

drutta Quercus frainetto is a deciduous Tree growing to 30 m (98ft 5in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcaakta Edible Parts: SeedEdible Uses: CoffeeSeed - raw or cooked. The seed is up to 3.5cm long and 1.2cm wide[200]. It can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread[183]. If the seed contains bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up

in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute.

tcanta Buttons Repellent TanninA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. The seed cups are used as buttons[95]. The bark is a commercial source of tannin[46, 223]. Tannin is also found in the leaves and wood[223]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dustuff[4].

dwatta Astringent DysenteryAny galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta Europe - Hungary, S. Italy and the Balkans. ksacta Not known

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Landscape Uses:Seashore. Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. This species thrives in Britain, despite our cooler summers, but it only bears acorns occasionally[11]. The acorns ripen in their first year[200]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200]. Special Features:Attractive foliage, Not North American native, Inconspicuous flowers or blooms.

6.2.19 Vitis rotundifolia

Muscadine Grape, Muscadine, Southern Fox Grape, Scuppernong, Muscadine Grape
5 tin 9 cyuc 4 kcaak 1 tcan 0 dwat 25 m hkc
hmimhtut cyutli kyuctup hwicli hrasjlutnyik hpa7tli flatprklwis hpa7tmwatli fyifxre7t hjonli

drutta Vitis rotundifolia is a deciduous Climber growing to 25 m (82ft 0in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to July, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcaakta Edible Parts: Fruit Leaves ShootsEdible Uses: Fruit - raw or dried for winter use[1, 2, 22, 46]. Thick-skinned[61] with a pleasant musky flavour[11, 200, 219]. Pleasant to eat raw, the fruit is excellent in jellies, pies etc[183]. The fruit is up to 25mm in diameter[200] and is produced in small bunches[235]. Leaves - cooked[55]. Young leaves are wrapped around other foods and then baked, they impart a pleasant flavour. Young tendrils - raw or cooked[55, 85].

tcanta DyeA yellow dye is obtained from the fresh or dried leaves[168].

nrakta South-eastern N. America - Delaware to Indiana and Kansas, south to Florida, Texas and Mexico. ksacta Woods, thickets, sandhills and shores[43].

propta Seed - best sown in a cold frame as soon as it is ripe[K]. Six weeks cold stratification improves the germination rate, and so stored seed is best sown in a cold frame as soon as it is obtained. Germination should take place in the first spring, but sometimes takes another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant out in early summer. Cuttings of mature

dwatta Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta Central N. America. ksacta Rich soils along the banks of streams, floodplains, pastures, roadsides and edges of woodlands, often forming thickets[229].

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200]. Softwood cuttings from strongly growing plants in spring to early summer in a frame[200]. Layering in spring.

nwatta Thrives in a well-drained moisture-retentive loamy soil[11, 200]. Prefers some lime in the soil but is likely to become chlorotic if too much lime is present[1]. Succeeds in sun or partial shade though it fruits better in a sunny position[11, 200]. Closely related to *Prunus rivularis*, and possibly no more than a form of that species[274]. A fast-growing but short-lived species, it can reach flowering and fruiting age within 3 years from seed[229]. It is cultivated for its edible fruit in N. America, where there are some named varieties[1, 46, 61]. It has also been hybridized with other species to produce new fruiting cultivars[82]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. This species suckers freely in the wild, forming quite large thickets[82]. Plants in this genus are notably susceptible to honey fungus[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A clumping plant, forming a colony from shoots away from the crown but with a limited spread [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

6.2.76 Acer macrophyllum

Oregon Maple, Bigleaf maple, Oregon Maple
5 tin 9 cyuc 3 kcaak 0 tcan 1 dwat m hkc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprklwis hpa7tmwatli hjonli

drutta Acer macrophyllum is a deciduous Tree growing to 30 m (98ft) by 12 m (39ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in April, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcaakta Edible Parts: Flowers Inner bark Leaves Sap SeedEdible Uses: SweetenerThe sap contains a certain amount of sugar and can either be used as a drink, or can be concentrated into a syrup by boiling off the water[105, 177, 183]. The syrup is used as a sweetener on many foods. The concentration of sugar is somewhat lower than in the sugar maples (*A. saccharum*). The tree trunk is tapped in the early spring, the sap flowing better on warm sunny days following a frost. The best sap production comes from cold-winter areas with continental climates. Inner bark[177]. Eaten in small quantities with oil[257]. No more details are given but inner bark is often dried, ground into a powder and then used as a thickening in soups etc or mixed with cereals when making bread. The leaves, when wrapped round food during baking, impart a nice flavour to the food[99, 118]. Yellow flower clusters - raw. They are sweet with nectar[183]. Seeds - sprouted and then boiled[226]. The sprouted seeds are generally bitter, but the young shoots are quite sweet and juicy[257]. The seeds are about 6mm long and are produced in small clusters[82].

tcanta Basketry Companion Fibre Fuel Hair Preservative Scourer WoodThe leaves are packed around apples, rootcrops etc to help preserve them[18, 20]. A sticky gum obtained from the buds in spring has been mixed with oil and used as a hair tonic[257]. A fibre obtained from the inner bark is used for making scouring pads, rope and crude dresses[99, 118, 257]. It was harvested in the spring and was also used in making baskets[257]. Young stems are used as coarse twine warp and weft in the manufacture of baskets[257]. Wood - light, soft, not strong, close grained. It is highly valued for timber, furniture and indoor use and is also used for carving bowls, veneer etc[46, 61, 82, 99, 118, 229]. It makes an excellent fuel, producing a hot smokeless flame[226].

dwatta TB TonicAn infusion of the bark has been used in the treatment of TB[257]. The raw sap has been used as a tonic[257].

nrakta Western N. America - southern Alaska to California. ksacta Found in a variety of soil types, on the banks of streams, in rich bottom lands and on rocky slopes of mountain valleys[82, 229].

propta Seed - best sown as soon as it is ripe in a cold frame, it usually germinates in the following spring. Pre-soak stored seed for 24 hours and then stratify for 2 - 4 months at 1 - 8°C. It can be slow to germinate. The seed can be harvested 'green' (when it has fully developed but before it has dried and produced any germination inhibitors) and sown immediately. It should germinate in late winter. If the seed is harvested too soon it will produce very weak plants or no plants at all[80, 113]. When large enough to handle, prick the seedlings out into individual pots and grow them on until they are 20cm or more tall before planting them out in their permanent positions. Layering, which takes about 12 months, is successful with most species in this genus. Cuttings of young shoots in June or July. The cuttings should have 2 - 3 pairs of leaves, plus one pair of buds at the base. Remove a very thin slice of bark at the base of the cutting, rooting is improved if a rooting hormone is used. The rooted cuttings must show new growth during the summer before being potted up otherwise they are unlikely to survive the winter.

nwatta Landscape Uses:Aggressive surface roots possible, Pollard, Specimen, Street tree. Of easy cultivation, it prefers a good moist well-drained soil[11] and a position that is at least moderately sunny[11, 200]. Grows well in heavy clay soils. Chlorosis can sometimes develop as a result of iron deficiency when the plants are grown in alkaline soils, but in general maples are not fussy as to soil pH. Growth of young plants is rapid in the wild, slowing down after 40 - 50 years with a maximum life span of about 275 years[229]. This species thrives in Britain but it can be cut back in a severe winter if that follows a mild autumn[11]. A very ornamental plant[1]. Most maples are bad companion plants, inhibiting the growth of nearby plants[18, 20]. Special Features:North American native, Fragrant flowers, Inconspicuous flowers or blooms.

6.2.77 Tilia tuan

5 tin 9 cyuc 3 kcaak 0 tcan 1 dwat 16 m hkc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprklwis hpa7tmwatli xre7t hjonli

drutta Tilia tuan is a deciduous Tree growing to 16 m (52ft 6in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from June to July, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcaakta Edible Parts: LeavesEdible Uses: TeaYoung leaves - raw. The dried flowers make a refreshing herb tea. A very good chocolate substitute is made from a paste of the ground fruits and flowers[2]. Trials on marketing the product failed because the paste decomposes readily[2].

tcanta Fibre WoodA fibre is obtained from the inner bark and is used in making sandals and cordage[46, 61, 189]. Wood[46]. No more details.

20°C. Prick out the seedlings into individual pots when they are large enough to handle. It you are intending to grow the plants outdoors, it is probably best to keep them in the greenhouse for their first winter and plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Mulch the roots well in late autumn to protect them from the cold. Cuttings of young shoots, 15cm with a heel, in spring[1]. Leaf bud cuttings in spring. Cuttings of fully mature wood in early summer. Takes 3 months. High percentage[3].

nwatta Requires a well-drained soil with plenty of moisture in the growing season, otherwise it is not fussy[1]. One report says that this plant is hardy to climatic zone 6 (tolerating frosts of -20°C)[200] but this is surely a misprint. The top growth is said to tolerate slight air frosts[88] and plants are said to be hardy on a wall in the mild areas of Britain, being commonly grown around Penzance[49, 59]. In S. America plants can tolerate occasional lows to -5°C[196]. Outdoor grown plants should have their roots restricted in order to reduce vegetative growth and encourage fruiting[1]. Plants do not generally fruit well in Britain[88]. In order to improve the chances of producing fruit it is best to hand pollinate using pollen from a flower that has been open for 12 hours to pollinate a newly opened flower before midday[88]. Cultivated for its edible fruit in S. America[46, 196]. Yields of 300 fruits per vine and 30 tonnes per hectare are recorded in S. America[196]. A climbing plant, attaching itself to other plants by means of tendrils that are produced at the leaf axils. Plants in this genus are notably resistant to honey fungus[200].

6.2.73 Sidalcea malviflora

Checkerbloom, Dwarf checkerbloom, California checkerbloom, Siskiyou checkerbloom
5 tlin 9 cyuc 3 kcaak 0 tcan 0 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Sidalcea malviflora is a PERENNIAL growing to 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 6. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcaakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked. The leaves have a very mild flavour and a slightly mucilaginous texture, they make a very acceptable salad[K]. The leaves can be cooked as greens[257]. The dried mashed leaves have been used as a flavouring with black manzanita berries (Arctostaphylos spp)[257].

nrakta South-western N. America - Oregon to Baja California. ksacta Grassy slopes and open forest glades[200].

propta Seed - sow spring in a greenhouse. When the seedlings are large enough to handle, prick them out into individual pots and plant them out in the summer. Division in the spring.

nwatta Prefers a deep fertile well-drained but moisture-retentive soil in full sun or with some shade at the hottest part of the day[200]. This species thrives in climates with a relatively cool summer and mild winters and tolerates temperatures down to about -15°C[200]. However, where prolonged cold temperatures are experienced without snow cover, it is best to mulch the plants well in winter with material such as bracken litter[200]. If the plants are cut back immediately after flowering they will usually produce a second flush of bloom in late summer[200]. The flowers last well when they are cut for indoor use[200]. There are many named varieties, selected for their ornamental value[200].

6.2.74 Corylus sieboldiana mandschurica

Hairy hazel, Japanese hazelnut,
5 tlin 9 cyuc 3 kcaak 1 tcan 0 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwisslip hpa7tmwatli fyif hjonli

drutta Corylus sieboldiana mandschurica is a deciduous Shrub growing to 4.5 m (14ft 9in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from April to

May, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcaakta Edible Parts: Oil SeedEdible Uses: OilSeed - raw or cooked[63, 74, 105]. Rich in oil. The seed ripens in mid to late autumn and will probably need to be protected from squirrels[K]. When kept in a cool place, and not shelled, the seed should store for at least 12 months[K]. An edible oil is obtained from the seed[105].

nrakta E. Asia - N. China to Manchuria. ksacta An understorey in deciduous, mixed and coniferous woods[74].

propta Seed - best sown as soon as it is harvested in autumn in a cold frame[164]. Germinates in late winter or spring. Stored seed should be pre-soaked in warm water for 48 hours and then given 2 weeks warm followed by 3 - 4 months cold stratification[164]. Germinates in 1 - 6 months at 20°C[164]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame or sheltered place outdoors for their first winter. Plant them out into their permanent positions in late spring or early summer[K]. Layering in autumn. Easy, it takes about 6 months[78, 200]. Division of suckers in early spring. Very easy, they can be planted out straight into their permanent positions.

nwatta An easily grown plant, it succeeds in most soils, but is in general more productive of seeds when grown on soils of moderate fertility[11, 200]. It does less well in rich heavy soils or poor ones[11, 63]. Does well in a loamy soil[11]. Very suitable for an alkaline soil[1, 11], but it dislikes very acid soils[17]. Plants are fairly wind tolerant[1, 11]. This species is closely allied to C. cornuta, and often bears good crops of seeds in Britain[11]. Members of this genus bear transplanting well and can be easily moved even when relatively large[11].

6.2.75 Prunus munsoniana

Wild Goose Plum
5 tlin 9 cyuc 3 kcaak 2 tcan 1 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Prunus munsoniana is a deciduous Tree growing to 8 m (26ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in April, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcaakta Edible Parts: Fruit SeedEdible Uses: Fruit - raw or cooked[1, 46, 82]. Thin skinned with a juicy aromatic flesh that is often of good dessert quality[183]. It can be eaten out of hand, used in pies, preserves etc or be dried for later use[183]. We do not know how large the fruit is but it contains a seed the shell of which is 15mm x 20mm[200]. Seed - raw or cooked. Do not eat the seed if it is too bitter - see the notes above on toxicity.

tcanta Dye WoodA green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168]. Wood - hard, heavy. Of little commercial value because of its small size[229].

wood of the current seasons growth, December/January in a frame. These cuttings can be of wood 15 - 30cm long or they can be of short sections of the stem about 5cm long with just one bud at the top of the section. In this case a thin, narrow strip of the bark about 3cm long is removed from the bottom half of the side of the stem. This will encourage callusing and the formation of roots. Due to the size of these cuttings they need to be kept in a more protected environment than the longer cuttings. Layering.

nwatta Landscape Uses:Arbor. Prefers a deep rich moist well-drained moderately fertile loam[1, 200]. Grows best in a calcareous soil[200]. Succeeds in sun or partial shade though a warm sunny position is required for the fruit to ripen[200]. Prefers a position in full sun[160] Plants climb by means of tendrils[182]. They grow particularly well up elm trees[18]. Cultivated for its edible fruit in N. America[46, 61], there are some named varieties[183]. Most plants are self-fertile[160], but there are some cultivars that only produce female flowers and require pollination[183]. Any pruning should be carried out in winter when the plants are dormant otherwise they bleed profusely[182, 200]. Resistant to Phylloxera disease, a disease that almost destroyed the European grape crops. This species can be used as a root-stock in areas where the disease is prevalent and can also be used in breeding programmes with V. vinifera in order to impart resistance to that species[160]. Plants are , however, susceptible to infestation by aphis[160]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features: North American native, Inconspicuous flowers or blooms. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. Woody. Growth habit is a single or multiple shooting vine from a crown [1-2].

6.2.20 Sorbus torminalis

Wild Service Tree, Checkertree
5 tlin 9 cyuc 4 kcaak 2 tcan 0 dwat 20 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfripr hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Sorbus torminalis is a deciduous Tree growing to 20 m (65ft 7in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in June, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista The seeds probably contain hydrogen cyanide. This is the ingredient that gives almonds their characteristic flavour. Unless the seed is very bitter it should be perfectly safe in reasonable quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcaakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 5, 11, 74, 115, 183]. The taste is best after a frost because it turns sweeter. The fruit can also be bletted if it is going to be eaten raw[3, 183]. This involves storing the fruit in a cool dry place until it is almost but not quite going rotten. At this stage the fruit has a delicious taste, somewhat like a luscious tropical fruit. Rich in vitamin C. The fruit is up to 1.5cm across[200] and is borne in bunches which makes it easier to harvest[K].

tcanta WoodWood - heavy, fine grained, polishes well. Used for turning, wood carving[74, 115].

nrakta Europe, from Britain and Denmark south and east to N. Africa, the Caucasus and W. Asia. ksacta Woods, usually on clay[186], sometimes on limestone[17].

propta Seed - best sown as soon as it is ripe in a cold frame[78, 80]. If you have sufficient seed it can be sown in an outdoor seedbed[78, 80]. Stored seed germinates better if given 2 weeks warm then 14 - 16 weeks cold stratification[98], so sow it as early in the year as possible. Prick out the seedlings into individual pots when they are large enough

to handle. Seedlings are very slow to put on top-growth for their first year or two[11], but they are busy building up a good root system. It is best to keep them in pots in a cold frame for their first winter and then plant them out into their permanent positions in late spring.

nwatta Succeeds in most reasonably good soils so long as they are not too poor or acid, in an open sunny position[1, 11]. Prefers clay soils[3, 11]. Tolerates moderate shade[188], but does not fruit so well in such a position[K]. Grows best in the eastern half of Britain[121]. Plants are susceptible to fireblight[188]. Plants respond well to coppicing[186]. When found in a truly wild situation this species is considered to be an indication of primary woodland[200]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

6.2.21 Acer saccharum grandidentatum

Big-Tooth Maple, Canyon Maple, Rocky Mountain Sugar Maple

5 tlin 8 cyuc 4 kcaak 0 tcan 0 dwat 12 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfripr hpa7tli flatprikliwis hpa7tmwatli hjonli

drutta Acer saccharum grandidentatum is a deciduous Tree growing to 12 m (39ft) by 8 m (26ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from April to May, and the seeds ripen in September. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcaakta Edible Parts: Inner bark Sap SeedEdible Uses: SweetenerThe sap is relatively rich in sugar and can be made into a drink or concentrated into a syrup by boiling off the water[1, 2, 11, 34, 57]. The syrup is used as a sweetener on many foods. It can be harvested in late winter or early spring[[142], the flow is best on a warm sunny day after a frost. Trees on southern slopes in sandy soils give the best yields. It is best to make a hole about 7cm deep and about 1.3 metres above the ground[171]. Yields of 40 - 100 litres per tree can be obtained[142]. The best sap production comes from cold-winter areas with continental climates. Seed - boiled then roasted[62, 105, 159]. The seed is about 6mm long and is produced in small clusters[82]. Inner bark cooked. It is dried, ground into a powder and then used as a thickening in soups etc or mixed with cereals when making bread[105, 161].

tcanta Fuel Preservative WoodThe leaves are packed around apples, rootcrops etc to help preserve them[18, 20]. Wood - close grained, tough, hard, heavy. Used for furniture, ship building, etc[46, 61, 82, 171]. It is a good fuel.

nrakta Western N. America - Rocky Mountains. ksacta Found in moist sites such as wet canyons, valleys and the banks of mountain streams at elevations of 1200 - 2100 metres[229].

propta Seed - best sown as soon as it is ripe in a cold frame, it usually germinates in the following spring. A lot of the seed is non-viable, it is best to cut a few open to see if there is an embryo[113]. An average of 95% germination can be achieved from viable seed[98]. Pre-soak stored seed for 24 hours and then stratify for 2 - 4 months at 1 - 8°C. It can be slow to germinate, sometimes taking two years[125]. The seed can be harvested 'green' (when it has fully developed but before it has dried and produced any germination inhibitors) and sown immediately. It should germinate in late winter. If the seed is harvested too soon it will produce very weak plants or no plants at all[80, 113]. When large enough to handle, prick the seedlings out into individual pots and grow them on until they are 20cm or more tall before planting them out in their permanent positions. Layering, which takes about 12 months, is successful with most species in this genus. Cuttings of young shoots in June or July. The cuttings should have 2 - 3 pairs of leaves, plus one pair of buds at the base. Remove a very thin slice of bark at the base of the cut-

ting, rooting is improved if a rooting hormone is used. The rooted cuttings must show new growth during the summer before being potted up otherwise they are unlikely to survive the winter.

nwatta Landscape Uses:Firewood, Pest tolerant, Specimen, Street tree. Of easy cultivation, it prefers a good moist well-drained soil but succeeds on most soils[11, 98]. Chlorosis can often develop as a result of iron deficiency when the plants are grown in alkaline soils. Grows well in heavy clay soils. Trees need full light and a lot of space if they are to grow well[98]. Plants are hardy to about -45°C when fully dormant[160]. This species is not a great success in Britain[1], though it does better than once thought[11]. It grows well in Cornwall[59]. Slow growing when young[11]. Plants produce prodigious root growth but very little top growth in first year from seed[133]. A very ornamental tree[1] but a bad companion plant, inhibiting the growth of nearby plants[18, 20]. This species is commercially exploited in America for its sap[1, 11]. Along with *A. saccharum* and the sub-species *A. s. nigrum* it is the major source of maple syrup[11]. There are some named varieties[183]. The sap can be tapped within 10 - 15 years from seed but it does not flow so well in areas with mild winters[160]. Special Features:North American native, Inconspicuous flowers or blooms.

6.2.22 Cornus officinalis

Shan Zhu Yu, Asiatic dogwood, Japanese Cornel Dogwood 5 tlin 8 cyuc 4 kcaak 0 tcan 3 dwat 10 m hkuc hmimhtut cyutli tcup hwicli hrasljutnyikfrp hpa7tli flatprik-wisslip hpa7tmwatli xre7t hjonli

drutta *Cornus officinalis* is a deciduous Shrub growing to 10 m (32ft) by 10 m (32ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from February to March, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177]. The fully ripe fruit is quite pleasant but slightly astringent[K]. It is about 1.5cm long[200]. The fruit contains about 8.6% sugars, 2.9% malic acid, 0.74% ash[179].

dwatta Antibacterial Antifungal Antiperiodic Antiseptic Antitumor Astringent Diuretic Hepatic Hypotensive Malaria Tonic UrinaryShan Zhu Yu has been used for at least 2,000 years in Chinese herbal medicine. It is a herb that "stabilizes and binds" and is used principally to reduce heavy menstrual bleeding and unusually active secretions including copious sweating, excessive urine, spermatorrhoea and premature ejaculation[147, 238, 254]. Like all herbs that suppress bodily fluids (even excessive ones), it will simply prolong or lead to a worsening of symptoms if it is used without tonic or detoxifying herbs[254]. It is, therefore, normally used in combination with herbs such as *Rehmannia glutinosa* and is an ingredient of the "Pill of eight ingredients" which is used in China to "warm up and invigorate the yang of the loins"[254]. The fruit is antibacterial, antifungal, hypotensive, antitumor, astringent, diuretic, hepatic and tonic[116, 147, 176, 178, 238]. The fruit, without the seed, is decocted for the treatment of arthritis, fever and a wide range of other ailments[218, 279]. It is used in the treatment of senile lumbago, diabetes, cystitis, tinnitus etc[174, 254, 279]. The fruit has an antibacterial action, inhibiting the growth of *Bacillus dysenteriae* and *Staphylococcus*[176]. The fruit is harvested when fully ripe and is dried for later use[238]. The stem bark is astringent, antimalarial and tonic[218]. The plant is antibacterial, diuretic, hypotensive and a urinary antiseptic[218].

nrakta E. Asia - China, Japan, Korea. ksakta Woodland, 1200 - 1800 metres in W. China[109]. Mountains, slopes, forest margins and forests a elevations of 400 - 1500, occasionally to 2100 metres[266].

propta Seed - best sown as soon as it is ripe in a cold frame or in an outdoors seedbed if there is sufficient seed[80, 113]. The seed must be separated from the fruit flesh since

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

nwatta Landscape Uses:Border, Massing, Standard, Specimen, Street tree. An easily grown plant, it succeeds in any soil of good or moderate fertility[1], ranging from acid to shallow chalk[200]. Grows well in heavy clay soils. Succeeds in full sun or light shade[188]. A very ornamental plant[1], it is very closely related to *C. mas*[1, 11] but is more tree-like in its habit[K]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: Attractive flowers or blooms.

6.2.23 Pyrus pyrifolia culta

Asian Pear

5 tlin 9 cyuc 4 kcaak 0 tcan 1 dwat 10 m hkuc hmimhtut cyutli hgattcup hwicli hrasljutnyikfrp hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta *Pyrus pyrifolia culta* is a deciduous Tree growing to 10 m (32ft 10in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in April. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 105]. Crisp, juicy with a fine flavour[178]. The fruit contains about 6 - 9.5% sugar and up to 0.56% fruit acids[179].

dwatta Antiseptic Astringent Febrifuge Nerve PectoralAntiseptic, astringent, febrifuge, nervine, pectoral[178].

nrakta A cultivated form of *P. pyrifolia*. ksakta Not known in the wild.

propta Seed - best sown in a cold frame as soon as it is ripe in the autumn, it will then usually germinate in mid to late winter. Stored seed requires 8 - 10 weeks cold stratification at 1°C and should be sown as early in the year as possible[200]. Temperatures over 15 - 20°C induce a secondary dormancy in the seed[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for their first year. Plant them out in late spring or early summer of the following year. The seed of pear cultivars will not usually breed true to type.

nwatta Prefers a good well-drained loam in full sun[200]. Grows well in heavy clay soils. Tolerates light shade but does not fruit so well in such a position. Tolerates atmospheric pollution, excessive moisture and a range of soil types if they are moderately fertile[200]. Established plants are drought tolerant[200]. Plants are hardy to at least -15°C[200]. Cultivated for its edible fruit in China and Japan, there are many named varieties[183]. A hybrid between this plant and *P. communis culta* is more suitable for warmer climates[11].

6.2.24 Pyrus pyrifolia

Sand Pear, Chinese pear

5 tlin 9 cyuc 4 kcaak 0 tcan 1 dwat 10 m hkuc hmimhtut cyutli hgattcup hwicli hrasljutnyikfrp hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta *Pyrus pyrifolia* is a deciduous Tree growing to 10 m (32ft 10in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in April, and

seed after hot summers[137]. Trees are self-fertile but larger crops of better quality seeds are produced if cross-pollination takes place[229]. Carbon Farming - Cultivation: regional crop only. Management: standard.

6.2.70 Scirpus maritimus

Seaside Bulrush. Cosmopolitan Bulrush

5 tlin 9 cyuc 3 kcaak 0 tcan 1 dwat m hkuc htut cyutli tucphja7nh56s hwicli hrasljutnyik hpa7tli flatprik-wishsom hpa7tmwatli hjonli

drutta *Scirpus maritimus* is a PERENNIAL growing to 1 m (3ft 3in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August, and the seeds ripen from August to September. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in saline soils. It cannot grow in the shade. It prefers moist or wet soil and can grow in water. The plant can tolerate maritime exposure.

kcakta Edible Parts: Root SeedEdible Uses: Root - raw or cooked. Rich in starch, it is usually dried and ground into a powder[2, 55, 74, 144]. The roots form tubers at intervals along their length and new plants are formed from these tubers. When first formed, the tubers are white and starchy with a sweet coconut-milk flavour, they become black and woody with age[193]. Tubers can be up to 2.5cm in diameter[193]. Seed - cooked[257]. They can be ground into a powder and used as a mush[257].

tcanta Basketry WeavingThe leaves are used in weaving and basketry[74, 257]. The leaves have been used to secure the edges of woven mats, as the warp for sandals, as the warps and twining wefts for clothing, to secure the edges of skirts etc[257]. They have been used to make twined mats for the insides of houses[257].

dwatta Astringent DiureticThe root is astringent and diuretic[240]. It is used in the treatment of amenorrhoea, dysmenorrhoea, abdominal pain or tumours for post-partum females, abdominal distension and indigestion[176].

nrakta Found in most regions of the world, including Britain, but absent from the Arctic. ksakta Along the seashore, in shallow water of tidal rivers, also in ditches and ponds near the sea, avoiding shady positions[1, 17].

propta Seed - sow in a cold frame as soon as it is ripe in a pot standing in 3cm of water. Only just cover the seed with soil[200]. The seed usually germinates fairly quickly. Prick out the plants when large enough to handle and plant out in their permanent positions in early summer. Division in spring. Very easy, larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Succeeds in any wet to moisture retentive ground, pond margins and shallow water in full sun or shade[200].

6.2.71 Helianthus maximilianii

Maximilian Sunflower, Maximilian Daisy

5 tlin 10 cyuc 3 kcaak 0 tcan 0 dwat m hkuc htut cyutli tucp hwicli hrasljutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta *Helianthus maximilianii* is a PERENNIAL growing to 2.4 m (7ft 10in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from September to October, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Tubers - raw or cooked[22, 46, 61, 257]. Similar in flavour to Jerusalem artichokes, but lower yielding. Seed - raw or cooked[183]. An edible oil is obtained from the seed[183].

nrakta Central N. America - Minnesota and Manitoba to Saskatchewan, Missouri, Nebraska and Texas. ksakta Rich prairies[43], usually on drier soils[60]. Low moist areas, roadsides and prairies in Texas, often forming large colonies[274].

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

nwatta Management: Standard Staple Crop: Protein-oilLandscape Uses:Border, Container, Specimen. Succeeds in most soils in a sunny position[1]. Requires a rich soil[1]. Dislikes shade[1]. The young growth is extremely attractive to slugs, plants can be totally destroyed by them[K]. At least one named form has been developed. Called 'Prairie Gold', it is being investigated by the Land Institute in Salina, Kansas for its oil-seed potential in a non-tillage permaculture system[183]. The yield of edible tubers is not very high. This species is closely related to *H. giganteus*[1]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Plants have a running root system and can be invasive[1]. Special Features:Attracts birds, North American native, Naturalizing, Attracts butterflies, Suitable for cut flowers, Suitable for dried flowers. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2]. The root pattern is tuberous with swollen potato-like roots [1-2].

6.2.72 Passiflora mollisima

Banana Passion Fruit

5 tlin 9 cyuc 3 kcaak 0 tcan 0 dwat m hkuc htut cyutli tucp hwicli hrasljutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta *Passiflora mollisima* is an evergreen Climber growing to 5 m (16ft 5in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf all year, in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[46, 105]. An agreeable flavour[2]. An aromatic taste, it can be eaten out of hand or used as a flavouring in ice creams, fruit salads, puddings etc[183]. A juice made from the fruit is highly prized in S. America[183]. Individual fruits are up to 15cm long and weigh 50 - 150g[196].

nrakta S. America - Venezuela and Colombia to Bolivia and Peru. ksakta Forests in the Andes to elevations of 3400 metres[196].

propta Pre-soak the seed for 12 hours in warm water and then sow late winter or early spring in a warm greenhouse. If sown in January and grown on fast it can flower and fruit in its first year[88]. The seed germinates in 1 - 12 months at

number of small seeds, but these are easily eaten with the fruit[K].

nrakta E. Asia - S.E. China. ksacta Mountain slopes or along river banks, 200 - 600 metres in S. Chekiang, S. Kiangsi, Fukien and N. Kwangtung[198].

propta Seed - sow spring in a greenhouse[133]. It is probably best if the seed is given 3 months stratification[113], either sow it in a cold frame as soon as it is ripe in November or as soon as it is received. Fresh seed germinates in 2 - 3 months at 10°C, stored seed can take longer[133]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for at least their first winter. When the plants are 30cm or more tall, plant them out into their permanent positions in late spring or early summer, after the last expected frosts[K]. Most seedlings are male[126]. The seedlings are subject to damping off, they must be kept well ventilated[113]. Cuttings of softwood as soon as ready in spring in a frame[K]. Cuttings of half-ripe wood, July/August in a frame. Very high percentage[113]. Cuttings of ripe wood, October/November in a frame.

nwatta Prefers a sound loamy neutral soil[1, 200]. Succeeds in semi-shade but full sun is best for fruit production[200]. Prefers a sheltered position[200]. Young spring growth is susceptible to frost damage[160]. Fruits are formed on second year wood and also on fruit spurs on older wood[126], any pruning is best carried out in the winter[219]. This is a climbing plant, supporting itself by twining around branches etc[200]. Plants in this genus are notably resistant to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required.

6.2.68 Sorbus thibetica

Tibetan whitebeam

5 tlin 9 cyuc 3 kcaak 0 tcan 0 dwat 20 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Sorbus thibetica is a deciduous Tree growing to 20 m (65ft) by 15 m (49ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in May, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

pista The seeds probably contain hydrogen cyanide. This is the ingredient that gives almonds their characteristic flavour. Unless the seed is very bitter it should be perfectly safe in reasonable quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. Very nice raw when it is fully ripe, preferably picked after a frost[K]. At this stage it has a mealy texture and a mild-flavoured slightly sweet fruit. The fruit can also be bletted. This involves storing the fruit in a cool dry place until it is almost but not quite going rotten. At this stage the fruit has a delicious taste, somewhat like a luscious tropical fruit. The fruit is up to 15mm across[200].

nrakta E. Asia - E. Himalayas to Burma. ksacta Dense forests on slopes or in valleys, rocky slopes, streambanks and shrubby thickets at elevations of 2400 - 3800 metres in Tibet[266].

propta Seed - best sown as soon as it is ripe in a cold frame[78, 80]. If you have sufficient seed it can be sown in an outdoor seedbed[78, 80]. Stored seed germinates better if given 2 weeks warm then 14 - 16 weeks cold stratification[98], so sow it as early in the year as possible. Prick out the seedlings into individual pots when they are large enough to handle. Seedlings are very slow to put on top-growth for their first year or two[11], but they are busy building up a good root system. It is best to keep them in pots in a cold frame for their first winter and then plant them out into their permanent positions in late spring.

nwatta Succeeds in most reasonably good soils in an open sunny position[11]. Tolerates light shade[188], though it fruits better in a sunny position[K]. Plants are susceptible to fireblight[188]. Closely related to *S. cuspidata*[11]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching; a heart root, dividing from the crown into several primary roots going down and out [2-1].

6.2.69 Carya cathayensis

Chinese Hickory

5 tlin 9 cyuc 3 kcaak 3 tcan 0 dwat 18 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyif hjonli

drutta Carya cathayensis is a deciduous Tree growing to 18 m (59ft 1in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf from June to October, in flower from April to May, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Oil SeedEdible Uses: OilSeed - raw or cooked[46, 61, 105, 109]. Rich in oil[266]. it has a sweet flavour and is highly esteemed by the Chinese[137]. The seed ripens in late autumn and, when stored in its shell in a cool place, will keep for at least 6 months[K]. An edible oil from the seed is used in cooking[109]. Carbon Farming - Staple Crop: oil.

tcanta Fuel Fuel Oil Wood WoodWood - hard, tough, elastic. Used for tool handles etc[46, 61, 109]. A very good fuel, burning well and giving off a lot of heat.

nrakta E. Asia - E. China. ksacta Narrow moist valleys and the foot of mountains[109]. Forests on mountain slopes, valleys, and riverbanks at elevations of 400 - 1500 metres[266].

propta Seed - requires a period of cold stratification. It is best sown in a cold frame as soon as it is ripe[78]. Stored seed should be kept moist (but not wet) prior to sowing and should be sown in a cold frame as soon as possible[78]. Where possible, sow 1 or 2 seeds only in each deep pot and thin to the best seedling. If you need to transplant the seedlings, then do this as soon as they are large enough to handle, once more using deep pots to accommodate the tap root. Put the plants into their permanent positions as soon as possible, preferably in their first summer, and give them some protection from the cold for at least the first winter[78, K]. Seed can also be sown in situ so long as protection is given from mice etc and the seed is given some protection from cold[200] (a plastic bottle with the top and bottom removed and a wire mesh top fitted to keep the mice out is ideal)

nwatta Management: Standard Regional Crop Staple Crop: OilPrefers a deep moisture-retentive loam in a sunny sheltered position, requiring a good summer for best development[1, 63, 137, 200]. Slow growing[200]. Dislikes wet exposure[109]. Plants are intolerant of much frost[109]. Another report says that plants succeeds in climatic zone 6, which suggests that they should tolerate temperatures down to about -15 and -20°C[200]. Cultivated for fod in China[266], the edible seed is often sold in local markets in China[137]. Plants are strongly tap-rooted and should be planted in their permanent positions as soon as possible[1, 137]. Sowing in situ would be the best method so long as the seed could be protected from mice[1, 200]. Trees are late coming into leaf (usually late May to June) and lose their leaves early in the autumn (usually in October)[137]. During this time they cast a heavy shade. These factors combine to make the trees eminently suitable for a mixed woodland planting with shrubs and other trees beneath them[137]. Plants in this genus are notably resistant to honey fungus[200]. Most species in this genus have quite a wide range of distribution and, in order to find trees more suited to this country, seed from the most appropriate provenances should be sought[137]. Most trees growing in Britain at present tend to only produce good

the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by In-sects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. Hard and gritty[11]. Firm crisp and juicy when fully ripe, they are eaten out of hand or used in fruit salads, pies or baked etc[183]. The fruit is up to 3cm long[200]. Up to 5cm in another report[194]. The average yield from wild trees in the Himalayas is 83kg per year, though some trees yield up to 200kg[194]. The fruit contains about 4.9% sugars, 3.2% protein, 0.9% pectin[194].

dwatta Antiseptic Astringent Febrifuge Nerveine PectoralAntiseptic, astringent, febrifuge, nervine, pectoral[178].

nrakta E. Asia - China. ksacta Warm rainy regions at elevations of 100 - 1400 metres in China[266]. Naturalized in low mountains and around villages in C. and S. Japan[58].

propta Seed - best sown in a cold frame as soon as it is ripe in the autumn, it will then usually germinate in mid to late winter. Stored seed requires 8 - 10 weeks cold stratification at 1°C and should be sown as early in the year as possible[200]. Temperatures over 15 - 20°C induce a secondary dormancy in the seed[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for their first year. Plant them out in late spring or early summer of the following year.

nwatta Prefers a good well-drained loam in full sun[200]. Grows well in heavy clay soils. Tolerates light shade but does not fruit so well in such a position. Tolerates atmospheric pollution, excessive moisture and a range of soil types if they are moderately fertile[200]. Established plants are drought tolerant[200]. Plants are hardy to at least -15°C[200]. A parent of the cultivated Asian pears[11]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching; a heart root, dividing from the crown into several primary roots going down and out [2-1].

6.2.25 Actinidia purpurea

Purple hardy kiwi

5 tlin 9 cyuc 4 kcaak 1 tcan 0 dwat 10 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli nyanhjen hjonli

drutta Actinidia purpurea is a deciduous Climber growing to 10 m (32ft 10in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in June, and the seeds ripen in November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees, insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[3, 105]. Sweet[177, 183, 200]. The fruit is up to 2.5cm long[198]. It contains a number of small seeds, but these are easily eaten with the fruit[K].

nrakta E. Asia - W. China ksacta Mountain forests, thickets, streamsidess and moist places at elevations of 700 - 3600 metres[266].

propta Seed - sow spring in a greenhouse[133]. It is probably best if the seed is given 3 months stratification[113], either sow it in a cold frame as soon as it is ripe in November or as soon as it is received. Fresh seed germinates in 2 - 3 months at 10°C, stored seed can take longer[133]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for at least their first winter. When the plants are 30cm or more tall, plant them out into their permanent positions in late spring or early summer, after the

last expected frosts[K]. Most seedlings are male[126]. The seedlings are subject to damping off, they must be kept well ventilated[113]. Cuttings of softwood as soon as ready in spring in a frame[K]. Cuttings of half-ripe wood, July/August in a frame. Very high percentage[113]. Cuttings of ripe wood, October/November in a frame.

nwatta Prefers a sound loamy neutral soil[1, 200]. Succeeds in semi-shade but full sun is best for fruit production[200]. Prefers a sheltered position[200]. Dormant plants are very hardy but young spring growth is susceptible to frost damage[160]. Fruits are formed on second year wood and also on fruit spurs on older wood[126], any pruning is best carried out in the winter[219]. This is a climbing plant, supporting itself by twining around branches etc[200]. This species is possibly no more than a form of *A. arguta*[198], differing in its longer narrower leaves[126, 200]. It is treated as a synonym of *A. arguta* in the draft Flora of China[266]. At least one named variety has been developed for its edible fruit[183]. Plants in this genus are notably resistant to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. Woody. Growth habit is a single or multiple shooting vine from a crown [1-2]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching; a heart root, dividing from the crown into several primary roots going down and out [2-1].

6.2.26 Crataegus azarolus

Azarole

5 tlin 9 cyuc 4 kcaak 0 tcan 2 dwat 10 m hkuc hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatprikliwisslip hpa7tmwatli xre7t hjonli

drutta Crataegus azarolus is a deciduous Tree growing to 10 m (32ft 10in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked in pies, preserves etc[1, 2, 3, 11, 34, 183]. The fruit can be used fresh or dried for later use. A pleasant acid taste[89]. In warm temperate areas the fruit develops more fruit sugars and has a fragrant sugary pulp with a slightly acid flavour[183]. It can be eaten out of hand. In cooler zones, however, the fruit does not develop so well and is best cooked or used in preserves[183]. The fruit is very variable in size and colour; it is up to 25mm in diameter[200]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta S. Europe to W. Asia. ksacta Dry hillsides and mountains in woods and hedges[50].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold

stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. The azarole has long been cultivated for its edible fruit in S. Europe, though it is now going out of favour[3, 11]. There are some named varieties[46]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Hawthorns in general hybridize freely with other members of the genus[200]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

6.2.27 Ziziphus jujuba

Jujube
5 tlin 10 cyuc 4 kcaak 3 tcan 3 dwat 10 m hkuc
htut cyutli hgatkyuctcup hwicli hyishrasljutnyik hpa7tli flat-prikliwsslip hpa7tmwatli fyfkrx7t hjonli

drutta Ziziphus jujuba is a deciduous Tree growing to 10 m (32ft) by 7 m (23ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from April to May, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista Caution in diabetics on allopathic medication [301].

kcaakta Edible Parts: Fruit LeavesEdible Uses: Coffee/Fruit - raw or cooked[1, 2, 3, 100, 158]. Mealy and sweet[46]. A sourish-sweet flavour[174]. The fruit can be eaten fresh, dried like dates or cooked in puddings, cakes, breads, jellies, soups etc[183]. The dried fruit has the nicest taste[11, 132]. The fruits are often left to become wrinkled and spongy, which increases their sweetness, and are then eaten fresh or cooked[238]. The dried fruit can also be ground into a powder. This powder is used in the preparation of 'kochujang', a fermented hot pepper-soybean paste that resembles miso[183]. Fruits contain one or two seeds[238]. Average yields from wild trees in the Himalayas are 9.5kg per year[194]. The fruit contains about 8.7% sugars, 2.6% protein, 1.4% ash, 1.7% pectin and 1.3% tannin[194]. The fruit is about 25mm long, though it can be larger in cultivated varieties[200]. The fruit can be used as a coffee substitute[183]. Leaves - cooked. A famine food, they are only used when all else fails[179]. A nutritional analysis is available[218].

tcanta Charcoal Fuel Hedge Hedge WoodPlants can be grown as a hedge[178]. Wood - dense, hard, compact, tough. Used for turnery, agricultural implements etc[74, 146, 158].

It makes an excellent fuel[146] and a good charcoal[158]. Es-palier: tree or other plants that is trained to grow flat against a support (such as a trellis or wall).

dwatta Anodyne Antidote Astringent Cancer Diuretic Emollient Expectorant Hypnotic Narcotic Pectoral Poultice Refrigerant Sedative Skin Stomachic TonicJujube is both a delicious fruit and an effective herbal remedy. It aids weight gain, improves muscular strength and increases stamina[254]. In Chinese medicine it is prescribed as a tonic to strengthen liver function[254]. Japanese research has shown that jujube increases immune-system resistance. In one clinical trial in China 12 patients with liver complaints were given jujube, peanuts and brown sugar nightly. In four weeks their liver function had improved[254]. Antidote, diuretic, emollient, expectorant[11, 61, 174, 178, 194]. The dried fruits contain saponins, triterpenoids and alkaloids[279]. They are anodyne, anticancer, pectoral, refrigerant, sedative, stomachic, styptic and tonic[4, 176, 218]. They are considered to purify the blood and aid digestion[240]. They are used internally in the treatment of a range of conditions including chronic fatigue, loss of appetite, diarrhoea, pharyngitis, bronchitis, anaemia, irritability and hysteria[176, 238, 279]. The seed contains a number of medically active compounds including saponins, triterpenes, flavonoids and alkaloids[279]. It is hypnotic, narcotic, sedative, stomachic and tonic[147, 176, 218]. It is used internally in the treatment of palpitations, insomnia, nervous exhaustion, night sweats and excessive perspiration[176, 238]. The root is used in the treatment of dyspepsia[218]. A decoction of the root has been used in the treatment of fevers[4, 240]. The root is made into a powder and applied to old wounds and ulcers[240]. The leaves are astringent and febrifuge[4, 218]. They are said to promote the growth of hair[218]. They are used to form a plaster in the treatment of strangury[240]. The plant is a folk remedy for anaemia, hypertension, nephritis and nervous diseases[218]. The plant is widely used in China as a treatment for burns[218].

nrakta E. Asia - China, India, Sri Lanka, Nepal, Bhutan, Myanmar, Thailand, Malaysia, Indonesia to Australia. ksacta Dry gravelly or stony slopes of hills and mountains[74].

propta Seed - best sown in a cold frame as soon as it is ripe. Stored seed requires 3 months warm then 3 months cold stratification[113]. Germination should take place in the first spring, though it might take another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for at least their first winter. Plant out in early summer. Root cuttings in a greenhouse in the winter[200]. Best results are achieved if a temperature of 5 - 10°C can be maintained[238]. Cuttings of mature wood of the current season's growth, November to January in a frame[238]. Division of suckers in the dormant season[174]. They can be planted out direct into their permanent positions if required.

nwatta Succeeds in most soils so long as they are well-drained[3, 200]. Prefers an open loam and a hot dry position[1, 3]. Succeeds in an alkaline soil[200]. Plants are fast growing, even in poor soils[146]. Plants are hardy to about -20°C[200]. Another report says that they are hardy to about -30°C when fully dormant[160]. The jujube is often cultivated in warm temperate zones for its edible fruit, there are many named varieties[50, 183]. The trees need a hot dry summer if they are to fruit well, which rather restricts their potential in a country like Britain[238, K]. The tree spreads by root suckers and self-sowing, often forming dense thickets. Where the climate suits it, the plant can escape from cultivation and become an invasive and problematic weed[274]. Trees are resistant to most pests and diseases[160]. Responds well to coppicing[146]. Trees form a deep taproot and should be planted into their permanent positions as soon as possible[200]. Fast growing and quick to mature, it can fruit in 3 - 4 years from seed[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A sprouting standard sending up shoots from the base [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

drutta Aesculus chinensis is a deciduous Tree growing to 25 m (82ft) by 10 m (32ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in July, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The seed is rich in saponins. Although poisonous, saponins are poorly absorbed by the human body and so most pass through without harm. Saponins are quite bitter and can be found in many common foods such as some beans. They can be removed by carefully leaching the seed or flour in running water. Thorough cooking, and perhaps changing the cooking water once, will also normally remove most of them. However, it is not advisable to eat large quantities of food that contain saponins. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K].

kcaakta Edible Parts: SeedEdible Uses: Seed - cooked. It can be dried and ground into a powder and used as a gruel. The seed is quite large, it can be 3cm in diameter, and is easily harvested. Unfortunately it is also rich in saponins, these must be removed before it can be used as a food and this process also removes many of the minerals and vitamins, leaving behind mainly starch. See also the notes above on toxicity. The following notes apply to A. californica, but are probably also relevant here-. The seed needs to be leached of toxins before it becomes safe to eat - the Indians would do this by slow-roasting the nuts (which would have rendered the saponins harmless) and then cutting them into thin slices, putting them into a cloth bag and rinsing them in a stream for 2 - 5 days[213].

tcanta Soap WoodSaponins in the seed are used as a soap substitute[169]. The saponins can be easily obtained by chopping the seed into small pieces and infusing them in hot water. This water can then be used for washing the body, clothes etc. Its main drawback is a lingering odour of horse chestnuts[K].

dwatta Antirheumatic EmeticThe seed is antirheumatic and emetic[178, 218]. The sweet tasting seed is said to be used in the treatment of contracted limbs that are due to palsy or rheumatism[178, 218]. It is also used in the treatment of stomach aches[218].

nrakta E. Asia - N. China. ksacta Mountains of Szechwan[178]

propta Seed - best sown outdoors or in a cold frame as soon as it is ripe[11, 80]. The seed germinates almost immediately and must be given protection from severe weather[130]. The seed has a very limited viability and must not be allowed to dry out. Stored seed should be soaked for 24 hours prior to sowing and even after this may still not be viable[80, 113]. It is best to sow the seed with its 'scar' downwards[130]. If sowing the seed in a cold frame, pot up the seedlings in early spring and plant them out into their permanent positions in the summer.

nwatta Prefers a deep loamy well-drained soil but is not too fussy[11]. Plants grow best in eastern and south-eastern areas of England, probably needing a continental climate in order to thrive[11, 200]. Although the trees are very hardy when dormant, the new growth can be damaged by late spring frosts[11]. Most members of this genus transplant easily, even when fairly large[11].

6.2.66 Tilia japonica

Japanese Lime

5 tlin 9 cyuc 3 kcaak 0 tcan 1 dwat 20 m hkuc
hmimhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Tilia japonica is a deciduous Tree growing to 20 m (65ft 7in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid,

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

kcaakta Edible Parts: Flowers Fruit LeavesEdible Uses: Tea/Young leaves - raw or cooked[105, 177]. Flowers - par-boiled to remove the bitterness and used as greens or added to soups[183]. A tea is made from the flowers[177, 183]. Fruit[105, 183]. No further details are given. This report possibly refers to the fact that the seed and flowers of some species can be made into a chocolate substitute. A very good chocolate substitute is made from a paste of the ground fruits and flowers[2]. Trials on marketing the product failed because the paste decomposes readily[2].

tcanta Fibre WoodA fibre is obtained from the inner bark and used for sandals, cordage etc[46, 61, 189]. Wood - light, soft. Used for boxes, barrels etc[46, 61].

dwatta Antispasmodic Diaphoretic SedativeA tea made from the flowers is antispasmodic, diaphoretic and sedative[226].

nrakta E. Asia - China, Japan. ksacta Mountains all over Japan[58].

propta Seed - much of the seed produced in Britain is not viable, cut a few seedcases open to see if there is a seed inside[80]. If possible, obtain fresh seed that is ripe but has not as yet developed a hard seed coat and sow it immediately in a cold frame. It may germinate in the following spring though it could take 18 months[80]. Stored seed can be very slow to germinate. It has a hard seed coat, embryo dormancy and a hard coat on the pericarp. All these factors mean that the seed may take up to 8 years to germinate[80]. One way of shortening this time is to stratify the seed for 5 months at high temperatures (10°C at night, up to 30°C by day) and then 5 months cold stratification[80]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Layering in spring just before the leaves unfurl. Takes 1 - 3 years[78]. Suckers, when formed, can be removed with as much root as possible during the dormant season and replanted immediately[200].

nwatta Prefers a good moist loamy alkaline to neutral soil but succeeds on slightly acid soils[11, 200]. Grows poorly on any very dry or very wet soil[200]. Dislikes exposed positions[200]. Succeeds in sun or semi-shade[188]. Prefers a continental climate, growing more slowly and not producing fertile seed in areas with cool summers[200]. Lime trees tend to hybridize freely if other members of the genus are growing nearby[238]. If growing plants from seed it is important to ensure the seed came from a wild source or from an isolated clump of the single species[K]. Grows best in a woodland situation, young plants tolerate a reasonable level of side shade[200]. The leaves appear early in the spring and are not troubled by frosts. Trees are usually attacked by aphids which cover the ground and the leaves with a sticky honeydew[188]. Cultivated for its wood in Japan[125]. A very good bee plant[125]. Quite tolerant of root disturbance, semi-mature trees up to 5 metres tall have been transplanted successfully. Plants in this genus are notably resistant to honey fungus[200].

6.2.67 Actinidia lanceolata

5 tlin 9 cyuc 3 kcaak 0 tcan 0 dwat 20 m hkuc
hmimhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli nyanhjen hjonli

drutta Actinidia lanceolata is a deciduous Climber growing to 20 m (65ft 7in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from May to June, and the seeds ripen in November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Bees, insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcaakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. The ovoid fruit is very small, about 10mm x 7mm, and hairless when fully ripe[198, 200, 266]. It contains a

6.2.63 *Carya pallida*

Sand Hickory
5 tin 9 cyuc 3 kcaak 0 tcan 1 dwat 30 m hkuc
htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyif hjonli

drutta *Carya pallida* is a deciduous Tree growing to 30 m (98ft 5in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf from June to October, in flower from April to May. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: SeedEdible Uses: Seed - raw or cooked[105, 177]. Rather thin-shelled, the seed is small and sweet[82, 235]. The seed is up to 3cm long[229]. The seed ripens in late autumn and, when stored in its shell in a cool place, will keep for at least 6 months[K].

tcanta Fuel WoodWood - heavy, hard, tough. Used for tool handles etc[82]. A good fuel, burning well and giving off a good heat[229].

dwatta Astringent DetergentThe inner bark is astringent and detergent[257]. It has been used as a dressing for cuts and has been chewed to treat sore mouths[257].

nrakta Eastern N. America - Oklahoma to Texas. ksacta Dry sandy or gravelly soils in woods[82, 137, 229].

propta Seed - requires a period of cold stratification. It is best sown in a cold frame as soon as it is ripe[78]. Stored seed should be kept moist (but not wet) prior to sowing and should be sown in a cold frame as soon as possible[78]. Where possible, sow 1 or 2 seeds only in each deep pot and thin to the best seedling. If you need to transplant the seedlings, then do this as soon as they are large enough to handle, once more using deep pots to accommodate the tap root. Put the plants into their permanent positions as soon as possible, preferably in their first summer, and give them some protection from the cold for at least the first winter[78, K]. Seed can also be sown in situ so long as protection is given from mice etc and the seed is given some protection from cold[200] (a plastic bottle with the top and bottom removed and a wire mesh top fitted to keep the mice out is ideal)

nwatta Prefers a deep moisture-retentive loam in a sunny sheltered position, requiring a good summer for best development[1, 63, 137, 200]. Slow growing[200]. Plants are strongly tap-rooted and should be planted in their permanent positions as soon as possible[1, 137]. Sowing in situ would be the best method so long as the seed could be protected from mice[1, 200]. Trees are late coming to leaf (usually late May to June) and lose their leaves early in the autumn (usually in October)[137]. During this time they cast a heavy shade. These factors combine to make the trees eminently suitable for a mixed woodland planting with shrubs and other trees beneath them[137]. Plants in this genus are notably resistant to honey fungus[200]. Most species in this genus have quite a wide range of distribution and, in order to find trees more suited to this country, seed from the most appropriate provenances should be sought[137]. Most trees growing in Britain at present tend to only produce good seed after hot summers[137]. Trees are self-fertile but larger crops of better quality seeds are produced if cross-pollination takes place[229].

6.2.64 *Ulmus glabra*

Wych Elm, Table-top Scotch Elm, Scotch Elm
5 tin 7 cyuc 3 kcaak 0 tcan 2 dwat 30 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Ulmus glabra* is a deciduous Tree growing to 30 m (98ft) by 25 m (82ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from February to March, and the seeds ripen from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral

and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: Fruit Inner bark LeavesEdible Uses: Leaves - raw or cooked[179, K]. They can be a little bit bitter, especially if not very young, and have a mucilaginous texture[K]. They make a nice addition to a mixed salad[K]. Immature fruits, used just after they are formed, can be eaten raw[132]. An aromatic, unusual flavour, leaving the mouth feeling fresh and the breath smelling pleasant[132]. They contain about 34.4% protein, 28.2% fat, 17% carbohydrate, 5% ash[179]. The fruit is about 2.5cm long[200]. Inner bark - mucilaginous[179]. No more details are given but inner bark is often dried, ground into a powder and then used as a thickening in soups etc or mixed with cereals when making bread[K].

tcanta Fibre WoodA fibre from the inner bark is used for mats and making ropes[100]. Wood - very durable under water, fairly hard, elastic, withstands abrasion and salt water. Used for water pipes, wheels, mallet heads, ships keels etc[46, 61, 67, 100].

dwatta Astringent Bach Demulcent Diuretic Eczema HomeopathyThe inner bark is astringent, demulcent and mildly diuretic[9]. It is used both internally and externally in the treatment of diarrhoea, rheumatism, wounds, piles etc and is also used as a mouthwash in the treatment of ulcers[4, 9, 66]. The inner bark is harvested from branches 3 - 4 years old and is dried for later use[9]. The plant is used in Bach flower remedies - the keywords for prescribing it are 'Occasional feelings of inadequacy', 'Despondency' and 'Exhaustion from over-striving for perfection'[209]. A homeopathic remedy is made from the inner bark[9]. It is used in the treatment of eczema[9].

nrakta Europe, including Britain, from Scandinavia south and east to Spain, north and west Asia. ksacta Woods, hedges and by streams, commoner in the west and north[17].

propta Seed - if sown in a cold frame as soon as it is ripe, it usually germinates within a few days[200]. Stored seed does not germinate so well and should be sown in early spring[200]. The seed can also be harvested 'green' (when it has fully developed but before it dries on the tree) and sown immediately in a cold frame. It should germinate very quickly and will produce a larger plant by the end of the growing season[80]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Plants should not be allowed to grow for more than two years in a nursery bed since they form a tap root and will then move badly. Layering of suckers or coppiced shoots[200].

nwatta Landscape Uses:Specimen. Easily grown in any soil of at least moderate quality so long as it is well drained[1]. Prefers a deep or heavy soil that is moist but not waterlogged and does not thrive if the soil is markedly acid[186]. Moderately shade tolerant[186]. Very wind resistant and tolerant of maritime exposure[186]. Trees cast a dense shade[186]. Rarely produces suckers but responds well to coppicing[186]. The wych elm is subject to 'Dutch elm disease' (though less so than *U. procera*), a disease that has destroyed the greater part of all the elm trees growing in Britain. Mature trees killed back by the disease will often regrow from suckers, but these too will succumb when they get larger. There is no effective cure (1992) for the problem, but most *E. Asian*, though not Himalayan, species are resistant to the disease so the potential exists to develop new resistant hybrids with the native species. The various species hybridize freely, the pollen stores well and can be kept for use with species that flower at different times. A very ornamental tree[1], it is a food plant for the caterpillars of many lepidoptera species[30]. A good tree for growing grapes into[18]. Special Features: Not North American native, Inconspicuous flowers or blooms.

6.2.65 *Aesculus chinensis*

Chinese Horse Chestnut
5 tin 9 cyuc 3 kcaak 0 tcan 1 dwat 25 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

6.2.28 *Prunus cerasifera*

Cherry Plum, Myrobalan Plum, Newport Cherry Plum, Pissard Plum

5 tin 8 cyuc 4 kcaak 3 tcan 1 dwat 9 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Prunus cerasifera* is a deciduous Tree growing to 9 m (29ft) by 9 m (29ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in March, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: Fruit SeedEdible Uses: Fruit - raw or cooked in pies, tarts, jams etc[2, 5, 12, 34, 183]. The size of a small plum with a thin skin and a nice sweet flavour[183]. The flesh is somewhat mealy but is also juicy[K]. The fruit can hang on the tree until October[K]. The fruit is about 30mm in diameter and contains one large seed[200]. Seed - raw or cooked. Do not eat the seed if it is too bitter - see the notes above on toxicity.

tcanta Dye Hedge Hedge Rootstock ShelterbeltA green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168]. Makes quite a good windbreak hedge though it cannot stand too much exposure[1, 11, 29]. Often used as a rootstock for the cultivated plums, giving them a semi-dwarfing habit[61].

dwatta BachThe plant is used in Bach flower remedies - the keywords for prescribing it are 'Desperation', 'Fear of losing control of the mind' and 'Dread of doing some frightful thing'[209]. It is also one of the five ingredients in the 'Rescue remedy'[209]. Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta W. Asia? Original habitat is obscure. Often planted in hedgerows in Britain but rarely naturalized. ksacta Not known in a truly wild situation.

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame. Softwood cuttings from strongly growing plants in spring to early summer in a frame. Layering in spring. Division of suckers in the dormant season. They can be planted out direct into their permanent positions.

nwatta Landscape Uses:Specimen. Requires a well-drained moisture retentive soil[1, 11]. Succeeds in light shade but fruits better in a sunny position[11, 200]. Thrives in a loamy soil, doing well on limestone[11]. Grows well in heavy clay soils. Prefers some chalk in the soil but apt to become chlorotic if too much is present[1]. A very ornamental plant[1], it is sometimes cultivated for its edible fruit, unfortunately this is not often borne in large quantities in Britain[3, 17], but large crops are produced every 4 years or so[K]. There are some named varieties[183]. Included as a

part of *P. divaricata* by some botanists[11] though others include *P. divaricata* as a sub-species under this species[200]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features:Attractive foliage, Not North American native, All or parts of this plant are poisonous, Blooms are very showy. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A sprouting standard sending up shoots from the base [1-2].

6.2.29 *Akebia trifoliata*

Akebia, Threelobed Akebia
5 tin 8 cyuc 4 kcaak 2 tcan 2 dwat 9 m hkuc
pcimhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli hjonli

drutta *Akebia trifoliata* is a deciduous Climber growing to 9 m (29ft 6in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in April, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: TeaFruit - raw. Sweet but insipid[2, 3, 46, 61, 105]. The fruit has a delicate flavour and a soft juicy texture[K]. The flavour can be enhanced by the addition of a little lemon juice. Valued more as a novelty, the fruit looks somewhat like a deep-purple coloured sausage[183]. The fruit is 7 - 13cm long[200]. The dried young leaves are used as a tea substitute[46, 61, 105, 183].

tcanta BasketryThe peeled stems are very pliable. They can be bleached and used in basket making[46, 61]. Landscape Uses: Arbor. The flowers are purple. The flowers have a sweet scent.

dwatta Analgesic Antibacterial Antifungal Antiinflammatory Antitumor Blood tonic Cardiotoxic Diuretic Emmenagogue Galactagogue UrinaryThe stems are analgesic, antibacterial, antifungal, anti-inflammatory, antitumor, blood tonic, cardiotoxic, diuretic, emmenagogue and galactagogue[147, 176]. Taken internally, it controls gram-positive bacterial and fungal infections and is used in the treatment of urinary tract infections, lack of menstruation, to improve lactation etc[176, 238]. The stems are harvested in the autumn and dried for later use[238].

nrakta E. Asia - China, Japan, Korea. ksacta Rocky places in woods and thickets to 1800 metres[58]. Semideciduous forest margins, open forest along valleys, scrub on hill-sides and by streams at elevations of 200 - 2100 metres[266].

propta Seed - best sown in a cold frame as soon as it is ripe. Surface sow in a light position[133]. The seed usually germinates in 1 - 3 months at 15°C[133]. Stored seed should be given 1 month cold stratification[113, 133] and can be very difficult to germinate. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for at least their first winter. Plant out in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame[11, 113]. The cuttings can be slow to root[200]. Cuttings can also be taken of soft wood in spring[113]. Root cuttings, December in a warm greenhouse[113]. Layering in early spring[11]. Very easy, the plants usually self-layer and so all you need to do is dig up the new plants and plant them out directly into their permanent positions.

nwatta Requires a well-drained moisture-retentive loamy soil[11, 200]. Succeeds in acid or alkaline soils[200]. Prefers partial shade but succeeds in full sun[3, 200]. Grows well on a north facing wall[219]. Dormant plants are hardy to about -20°C but they can be somewhat tender when young[200]. Another report says that this species is not as hardy as A. quinata, only tolerating temperatures down to -10°C. The young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. This species grows very well in S.W. England. Resentful of root disturbance, either grow plants in containers prior to planting them or plant them out whilst very young[219]. Plants are evergreen in mild winters[11]. Fast growing, it can be invasive. It grows well on deciduous trees[28]. Plants are not normally pruned, if they are growing too large they can be cut back by trimming them with shears in early spring[202]. Plants are shy to fruit, they possibly require some protection in the flowering season, hand pollination is advisable[3, 11]. Plants are probably self-sterile[182], if possible at least 2 plants should be grown, each from a different source. The flowers are sweetly scented[245]. The fruits are sold in local markets in Japan[46]. The ssp. A. trifoliata australis. (Diels.)Rehd. is used medicinally in China[176]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: Attractive foliage, Not North American native, Fragrant flowers, Attractive flowers or blooms.

6.2.30 *Cydonia oblonga*

Quince

5 tlin 9 cyuc 4 kcaak 3 tcan 2 dwat 7.5 m hkuc pcimhmimhut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikliw hpa7tmwatli xre7h jhoni

drutta *Cydonia oblonga* is a deciduous Tree growing to 7.5 m (24ft) by 7 m (23ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in May, and the seeds ripen in November. The species is hermaphrodite (has both male and female organs) and is pollinated by insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The seed is poisonous[200]. Like many of the species in the family Rosaceae it contains hydrogen cyanide (this is the substance that gives almonds their characteristic flavour). In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcaaka Edible Parts: Flowers FruitEdible Uses: Drink Gum Pectin PectinFruit - raw or cooked[4]. When grown in warm temperate or tropical climates, the fruit can become soft and juicy and is suitable for eating raw[4]. In cooler climates such as Britain, however, it remains hard and astringent and needs to be cooked before being eaten[4]. It is used in jellies, preserves etc[9, 183]. The cooked fruit adds a delicious flavour to cooked apples[3, 37, 46, 61]. Strongly aromatic with a firm but rather gritty flesh[200]. The fruit is rich in pectin[200]. The fruit is about 10m long and 9cm wide, tapering to the stalk[200]. A nutritional analysis is available[218]. A drink can be made by adding the dried crushed seed to water, simmering for 5 minutes and sweetening to taste[183]. Flowers[183]. No further details are given.

tcaanta Gum Pectin Pectin Rootstock SizeA mucilage obtained from the seed coat is used as a gum arabic substitute to add gloss to material[61, 74]. The seed contains 20% mucilage and 15% fatty oils[74]. The fruit is rich in pectin[200]. Pectin is said to protect the body against radiation[201]. The leaves contain 11% tannin[240].

dwatta Antiinflammatory Antivinous Astringent Cardiac Carminative Demulcent Digestive Diuretic Emollient Expectorant Hypotensive Laxative Pectoral Refrigerant Restorative Stimulant TonicThe stem bark is astringent, it is used in the treatment of ulcers[218]. The seed is a mild but reliable laxative, astringent and anti-inflammatory[9]. When soaked in water, the seed swells up to form a mucilaginous mass. This has a soothing and demulcent action when taken internally[4] and is used in the treatment of respiratory diseases,

especially in children[240]. This mucilage is also applied externally to minor burns etc[9]. The fruit is antivinous, astringent, cardiac, carminative, digestive, diuretic, emollient, expectorant, pectoral, peptic, refrigerant, restorative, stimulant and tonic[4, 9, 46, 218]. The unripe fruit is very astringent, a syrup made from it is used in the treatment of diarrhoea and is particularly safe for children[4, 254]. The fruit, and its juice, can be used as a mouthwash or gargle to treat mouth ulcers, gum problems and sore throats[254]. The leaves contain tannin and pectin[240]. Tannin can be used as an astringent whilst pectin has a beneficial effect on the circulatory system and helps to reduce blood pressure[K].

nrakta Europe - Mediterranean. An occasional garden escape in Britain[17]. ksacta Damp rich soils in hedgerows and thickets[50, 254].

propta Seed - probably best sown in a cold frame as soon as it is ripe[K], it can also be sown in February[78]. It requires stratification[98], pre-chill the seed for 18 weeks if it is fresh, whilst old seed will require 2 weeks of warm stratification first and then 18 weeks cold treatment[164]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of mature wood, November in a cold frame[3, 37]. Layering in spring. Takes 1 year[78]. Suckers, removed in spring[200].

nwatta Succeeds in most soils but prefers a light moist fertile soil and a sunny position[3, 37, 200]. Dislikes very dry or waterlogged soils[202]. Succeeds in semi-shade but does not fruit so well in such a position[202]. Plants also tolerate quite deep shade[219], though they will often not fruit at all in such a position[K]. Plants are hardy to about -15°C[202], though the fruit seldom ripens in the north of Britain unless it is grown against a sunny wall[4]. The quince has been cultivated for over two thousand years for its edible fruit and its seed, though it is not a widely grown crop[4, 46, 61, 132]. It is also much used as a dwarfing rootstock for pears and some other fruits[200]. There are some named varieties[200]. Plants require warm summers in order to fully ripen their fruit[200]. The var. 'Maliformis' ripens well in cooler summers[200]. The plant is heat tolerant in zones 9 through 3. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2].

6.2.31 *Crataegus laciniata*

5 tlin 9 cyuc 4 kcaak 0 tcan 2 dwat 6 m hkuc hmimhut cyutli hgattcuphja7n hwicli hrasljutnyikfp hpa7tli flatprikliwslip hpa7tmwatli xre7h jhoni

drutta *Crataegus laciniata* is a deciduous Tree growing to 6 m (19ft) by 6 m (19ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in June, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Midgees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcaaka Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 105]. A pleasant acid taste[74]. The fruit is about 1.5cm in diameter[200]. A nice taste with a very good flesh to seed ratio, it can be eaten in quantity for dessert[K]. The

self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcaaka Edible Parts: Sap SeedEdible Uses: SweetenerSeed - raw or cooked in pies, cakes etc[183]. Sweet, with a very fine flavour[183], it has the largest seeds of the hickories[227], up to 5cm long[229]. Probably the finest flavoured hickory[117]. The shell is hard and thick[101, 117] and the cracking quality is poor compared to *C. ovata*[183]. The seed ripens in late autumn and, when stored in its shell in a cool place, will keep for at least 6 months[K]. Sap - a sweet flavour[62]. Tapped in spring, it can be boiled down to a syrup or sugar and be used in similar ways to maple syrup[101, 183].

lcanta Fuel WoodWood - close-grained, tough, hard, heavy, elastic, very flexible. It weighs 50 lb. per cubic foot. An excellent wood, it is used for tool handles, baskets, fuel etc[46, 61, 63, 82, 226, 227]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Astringent DetergentThe inner bark is astringent and detergent[257]. It has been used as a dressing for cuts and has been chewed to treat sore mouths[257].

nrakta Eastern N. America - New York and Pennsylvania to Indiana, Iowa and Kansas. ksacta Deep rich soils of flood-plains and bottomlands[43, 62]. It grows best on neutral or slightly alkaline soils and tolerates shallow flooding in early spring[229].

propta Seed - requires a period of cold stratification. It is best sown in a cold frame as soon as it is ripe[78]. Stored seed should be kept moist (but not wet) prior to sowing and should be sown in a cold frame as soon as possible[78]. Where possible, sow 1 or 2 seeds only in each deep pot and thin to the best seedling. If you need to transplant the seedlings, then do this as soon as they are large enough to handle, once more using deep pots to accommodate the tap root. Put the plants into their permanent positions as soon as possible, preferably in their first summer, and give them some protection from the cold for at least the first winter[78, K]. Seed can also be sown in situ so long as protection is given from mice etc and the seed is given some protection from cold[200] (a plastic bottle with the top and bottom removed and a wire mesh top fitted to keep the mice out is ideal)

nwatta Management: Standard Regional Crop Staple Crop: OilLandscape Uses:Pest tolerant, Aggressive surface roots possible. Prefers a deep moisture-retentive loam in a sunny sheltered position, requiring a good summer for best development[1, 63, 137, 200]. A very ornamental but slow growing tree[1], it is sometimes cultivated for its edible seed, and is also sold in local markets in N. America[82]. There are some named varieties[183] though some of these are likely to be hybrids. 'Fayette' is a thin shelled form[200]. 'Henry' has a very large nut[200]. Trees have been planted on an experimental scale in Germany for their wood[50]. Hybridizes in the wild with *C. ovata*[227]. Trees take up to 15 years from seed to bear fruit[117]. Plants are strongly tap-rooted and should be planted in their permanent positions as soon as possible[1, 137]. Sowing in situ would be the best method so long as the seed could be protected from mice[1, 200]. Trees are late coming into leaf (usually late May to June) and lose their leaves early in the autumn (usually in October)[137]. During this time they cast a heavy shade. These factors combine to make the trees eminently suitable for a mixed woodland planting with shrubs and other trees beneath them[137]. Plants in this genus are notably resistant to honey fungus[200]. Most species in this genus have quite a wide range of distribution and, in order to find trees more suited to this country, seed from the most appropriate provenances should be sought[137]. Most trees growing in Britain at present tend to only produce good seed after hot summers[137]. Trees are self-fertile but larger crops of better quality seeds are produced if cross-pollination takes place[229]. Special Features:North American native, Wetlands plant, Inconspicuous flowers or blooms. The plant is heat tolerant in zones 9 through 4. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the

temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

6.2.62 *Carya ovalis*

Sweet Pignut

5 tlin 9 cyuc 3 kcaak 0 tcan 0 dwat 30 m hkuc hutu cyutli tcup hwicli hrasljutnyik hpa7tli flatprikliw hpa7tmwatli yfij hjoni

drutta *Carya ovalis* is a deciduous Tree growing to 30 m (98ft 5in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf from June to October, in flower from April to May. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcaaka Edible Parts: Sap SeedEdible Uses: Seed - raw or cooked[1, 101, 105]. Small but sweet[11, 82] with a thin shell[159, 235]. The seed ripens in late autumn and, when stored in its shell in a cool place, will keep for at least 6 months[K]. Sap - raw. Tapped in the spring, it has a sweet flavour[101].

tcaanta Fuel WoodWood - heavy, hard, tough and elastic. Used for making wagons, agricultural implements, tool handles etc[63, 82].

nrakta Eastern N. America - Massachusetts to Michigan, Virginia, Illinois, Georgia and Missouri. ksacta Rich woodlands and on hillsides[43, 82].

propta Seed - requires a period of cold stratification. It is best sown in a cold frame as soon as it is ripe[78]. Stored seed should be kept moist (but not wet) prior to sowing and should be sown in a cold frame as soon as possible[78]. Where possible, sow 1 or 2 seeds only in each deep pot and thin to the best seedling. If you need to transplant the seedlings, then do this as soon as they are large enough to handle, once more using deep pots to accommodate the tap root. Put the plants into their permanent positions as soon as possible, preferably in their first summer, and give them some protection from the cold for at least the first winter[78, K]. Seed can also be sown in situ so long as protection is given from mice etc and the seed is given some protection from cold[200] (a plastic bottle with the top and bottom removed and a wire mesh top fitted to keep the mice out is ideal)

nwatta Prefers a deep moisture-retentive loam in a sunny sheltered position, requiring a good summer for best development[1, 63, 137, 200]. Slow growing[200]. Considered by some botanists to be no more than a form of *C. glabra*[101], this tree is more regular cropping than other species[159]. Plants are strongly tap-rooted and should be planted in their permanent positions as soon as possible[1, 137]. Sowing in situ would be the best method so long as the seed could be protected from mice[1, 200]. Trees are late coming into leaf (usually late May to June) and lose their leaves early in the autumn (usually in October)[137]. During this time they cast a heavy shade. These factors combine to make the trees eminently suitable for a mixed woodland planting with shrubs and other trees beneath them[137]. Plants in this genus are notably resistant to honey fungus[200]. Most species in this genus have quite a wide range of distribution and, in order to find trees more suited to this country, seed from the most appropriate provenances should be sought[137]. Most trees growing in Britain at present tend to only produce good seed after hot summers[137]. Trees are self-fertile but larger crops of better quality seeds are produced if cross-pollination takes place[229]. The leaves are richly aromatic[245].

It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

kcakta Edible Parts: Manna Seed**Edible Uses:** CoffeeSeed - cooked. Up to 2.5cm long. It can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread[183]. The seed contains bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute. A sweet fluid exudes from insect damage on the stems and solidifies[2, 61, 105, 177]. This is edible and is sold as a manna in local markets in Iran[46]. It can be boiled down into a syrup and used for sweetening food[183].

tcanta Buttons Repellent Tannin WoodThe seed cups are used as buttons[95]. A mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit the growth of young plants[20]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. The leaves, bark and wood are used commercially as a source of tannins[223]. Wood. It is valued by wheelwrights, turners and cabinet makers[4]. Of little value[1, 11]. It does not weather well[100].

dwatta Astringent DysenteryAny galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta Europe to S.W. Asia. Naturalized in Britain[17]. **ksacta Hedges, thickets and woods in acid soils**[17, 100].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Grows well on chalk[98], even when the soil is shallow[188]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. Grows well near the coast[98]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. A very ornamental tree[1], it grows very well in Britain and is the fastest growing of the oaks in cultivation in this country[1]. The seed ripens in its second year[200]. Trees transplant badly unless they are moved regularly[11]. Hybridizes freely with other members of the genus[200]. This species is notably resistant to honey fungus[88, 200].

6.2.60 Quercus lyrata

Overcup Oak
5 tin 9 cyuc 3 kcaok 0 tcan 2 dwat 30 m hkuc
hmimhtut cyutli tcup hwicli jltunykifrip hpa7tli flatprikliwis hpa7tmwatli hjonli

drutta *Quercus lyrata* is a deciduous Tree growing to 30 m (98ft 5in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in April, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

kcakta Edible Parts: Seed**Edible Uses:** CoffeeSeed - cooked. The seed is about 25mm long[200], it can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed is fairly sweet and does not contain many bitter tannins[159]. It does not require much leaching but any bitterness can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute.

tcanta Repellent Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. Wood - close-grained, hard, tough, strong, heavy, very durable in contact with the ground[82]. It weighs 51lb per cubic foot. Used for construction, tools, furniture etc[46, 82, 227].

dwatta Astringent DysenteryThe leaves and bark are astringent[46, 61]. Any galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta Central and South-eastern N. America - New Jersey to Florida, west to Mississippi and Texas. **ksacta Bottomlands and wet woods**[43], usually on rich soils[82]. Wet, poorly-drained heavy clay soils[227, 229].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Landscape Uses:Aggressive surface roots possible, Specimen, Street tree. Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. Prefers warmer summers than are usually experienced in Britain, trees are not well suited to the British climate and usually grow poorly here. They fail to properly ripen their wood which results in frost damage overwinter[200]. A slow-growing but long-lived tree[227], it takes 25 - 30 years before it starts to produce seeds[229]. The tree flowers on new growth produced in spring, the seed ripening in its first year[200, 229]. Large crops are produced every 3 - 4 years with low production in the intervening years[229]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200]. **Special Features:**Attracts birds, North American native, Inconspicuous flowers or blooms.

6.2.61 Carya laciniosa

Shellbark Hickory
5 tin 9 cyuc 3 kcaok 3 tcan 1 dwat 30 m hkuc
htut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli fyif hjonli

drutta *Carya laciniosa* is a deciduous Tree growing to 30 m (98ft 5in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf from June to October, in flower from April to May, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is

fruit can be used in making pies, preserves, etc, and can also be dried for later use. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta WoodWood - heavy, close-grained, hard and tough. Used for tool handles etc[82, 74].

dwatta Cardiotoxic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta E. Asia. Occasionally self-sows in Britain[17]. **ksacta Mountain thickets and rocky slopes**[50].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. A very hardy species, tolerating temperatures down to at least -18°C[202]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

6.2.32 Humulus lupulus

Hop, Common hop, European Hop,
5 tin 7 cyuc 4 kcaok 3 tcan 5 dwat 6 m hkuc
hmimhtut cyutli hgatkyuctcup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli nyanhjen hjonli

drutta *Humulus lupulus* is a PERENNIAL CLIMBER growing to 6 m (19ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from July to August, and the seeds ripen from September to October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light

woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

pcista Skin contact with the plant causes dermatitis in sensitive people[222]. Hops dermatitis has long been recognized. Not only hands and face, but legs have suffered purpuric eruptions due to hop picking. Although only 1 in 3,000 workers is estimated to be treated, one in 30 are believed to suffer dermatitis[269]. Dislodged hairs from the plant can irritate the eyes[222]. Sedative effect may worsen depression. Avoid during pregnancy (due to antispasmodic action on uterus). Avoid with breast, uterine and cervical cancers [301].

kcakta Edible Parts: Leaves Root Shoots**Edible Uses:** Drink **Rutin** TeaYoung leaves and young shoots - cooked[2, 4, 5, 7, 9, 33, 37]. The flavour is unique and, to many tastes, delicious[183]. Young leaves can be eaten in salads[1, 183]. Use before the end of May[12]. The leaves contain rutin[218]. The fleshy rhizomes are sometimes eaten[183]. A tea is made from the leaves and cones[183]. It has a gentle calming effect[4]. The dried flowering heads of female plants are used as a flavouring and preservative in beer[2, 183]. They are also medicinal[2]. The flowering heads are sprinkled with bitter-tasting yellow translucent glands, which appear as a granular substance[4]. This substance prevents gram-negative bacteria from growing in the beer or wort[269]. Much of the hop's use as a flavouring and medicinal plant depends on the abundance of this powdery substance[4]. The seeds contain gamma-linolenic acid, an essential fatty acid that is said to have many important functions in the human body and is rarely found in plant sources[218]. The essential oil in the flowering heads is used as a flavouring in cereal beverages and mineral waters[269]. Extracts from the plant, and the oil, are used as flavouring in non-alcoholic beverages, frozen dairy desserts, candy, baked goods and puddings, with the highest average maximum use level of 0.072% reported for an extract used in baked goods[269].

tcanta Dye Essential Fibre PaperA fine brown dye is obtained from the leaves and flower heads[4, 100, 269]. An essential oil from the female fruiting heads is used in perfumery[213, 238]. Average yields are 0.4 - 0.5%[240]. Extracts of the plant are used in Europe in skin creams and lotions for their alleged skin-softening properties[269]. A fibre is obtained from the stems[46]. Similar to hemp (*Cannabis sativa*)[100] but not as strong[115], it is used to make a coarse kind of cloth[4]. It is sometimes used for filler material in corrugated paper or board products, but is unsuited for corrugated paper because of low pulp yield and high chemical requirement, or for production of high-grade pulp for speciality paper[269]. The fibre is very durable but it is difficult to separate, the stems need to be soaked beforehand for a whole winter[4]. A paper can also be made from the fibre, the stems are harvested in the autumn, the leaves removed and the stems steamed until the fibres can be removed. The fibre is cooked for 2 hours with lye and then hand pounded with mallets or ball mill for 2½ hours. The paper is brown in colour[189].

dwatta Anodyne Antianxiety Antibacterial Antiseptic Antispasmodic Appetizer Diuretic Dysentery Fibrifuge Galactagogue Hypnotic Leprosy Nervine Sedative Stomachic TonicHops have a long and proven history of herbal use, where they are employed mainly for their soothing, sedative, tonic and calming effect on the body and the mind. Their strongly bitter flavour largely accounts for their ability to strengthen and stimulate the digestion, increasing gastric and other secretions[254]. The female fruiting body is anodyne, antiseptic, antispasmodic, diuretic, fibrifuge, hypnotic, nervine, sedative, stomachic and tonic[4, 9, 21, 46, 165, 192, 218]. Hops are widely used as a folk remedy to treat a wide range of complaints, including boils, bruises, calculus, cancer, cramps, cough, cystitis, debility, delirium, diarrhoea, dyspepsia, fever, fits, hysteria, inflammation, insomnia, jaundice, nerves, neuralgia, rheumatism, and worms[269]. The hairs on the fruits contain lupulin, a sedative and hypnotic drug[213, 218]. When given to nursing mothers, lupulin increases the flow of milk - recent research has shown that it contains a related hormone that could account for this effect[7]. The decoction from the flower is said to remedy swellings and hardness of the uterus[269]. Hop flowers are much used as an infusion or can also be used to stuff pillows where the weight of the head will release the volatile oils[213]. The fruit is also applied externally as a poultice to ulcers, boils, painful swellings etc[4, 218], it is said to remedy

painful tumours[269]. The female flowering heads are harvested in the autumn and can be used fresh or dried[238]. Alcoholic extracts of hops in various dosage forms have been used clinically in treating numerous forms of leprosy, pulmonary tuberculosis, and acute bacterial dysentery, with varying degrees of success in China. The female fruiting body contains humulone and lupulone, these are highly bacteriostatic against gram-positive and acid-fast bacteria[240]. A cataplasm of the leaf is said to remedy cold tumours[269]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve *Humulus lupulus* for nervousness and insomnia (see [302] for critics of commission E).

nrakta Much of Europe, including Britain, to W. Asia. ksacta Hedgerows, woodlands and sunny waste ground[7].

propta Seed - sow spring in a cold frame[37]. Germination is fairly quick. Prick out the seedlings into individual pots as soon as they are large enough to handle and plant out in the summer or following spring. Division in spring as new growth begins[1]. Very easy, you can plant the divisions straight out into their permanent positions if required[K]. Basal cuttings in March. Harvest the shoots when they are about 10 - 15cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Landscape Uses:Ground cover, Screen. Easily grown in a good garden soil in sun or semi-shade[1, 53]. Prefers a deep rich loam[37] and a warm sheltered position[187]. Plants can succeed in dry shade if plenty of humus is incorporated into the soil, once established they are also somewhat drought tolerant[190]. Hops are reported to tolerate an annual precipitation of between 31 and 137cm, an annual temperature in the range of 5.6 to 21.3°C and a pH of 4.5 to 8.2[269]. Plants are very hardy tolerating temperatures down to about -20°C when dormant[187]. The young shoots in spring, however, can be damaged by any more than a mild frost[269]. A climbing plant, supporting itself by twining around the branches of other plants[219]. Hops are frequently cultivated, both commercially and on a domestic scale, in temperate zones for their seed heads which have many medicinal qualities and are also used as a flavouring and preservative in beer. There are many named varieties[183]. They grow best between the latitudes of 35 - 51°N and 34 - 43°S, with mean summer temperatures of 16 - 18°C[269]. Generally, for beer making, the unfertilized seed heads are preferred and so most male plants are weeded out[4]. Hops are fairly deep rooted, but with a network of shallow feeding roots. These horizontal feeding roots spread out at depth of 20 - 30 cm in the soil and give rise to fibrous roots in upper layers of soil[269]. The vertical roots develop downwards to a depth of about 150 cm with a spread of 183 - 244 cm and have no fibrous roots[269]. The bruised leaves are refreshingly aromatic whilst the flowers cast a pleasing scent[245]. A food plant for many caterpillars[30]. Dioecious. Male and female plants must be grown if seed is required. Special Features: Edible, Invasive, Naturalizing, Attracts butterflies, Suitable for dried flowers, Inconspicuous flowers or blooms. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. Growth habit is a single or multiple shooting vine from a crown [1-2]. Herbaceous. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

6.2.33 *Crataegus champlainensis*

Quebec hawthorn

5 tlin 9 cyuc 4 kcaak 0 tcan 2 dwat 6 m hkuc hmimhtut cyuti hgattcuphja7n hwicli hrasjutnyikfrp hpa7tli flatprikliw hpa7tmwatli xre7t hjonli

drutta *Crataegus champlainensis* is a deciduous Tree growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcaakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. A nice sweet flavour, the fruit is about 1.5cm in diameter[K]. The fruit can be used in making pies, preserves, etc, and can also be dried for later use. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta Northern N. America - Quebec to New York and Ontario. ksacta Thickets, streambanks and hillsides[204]. Limestone ridges[82].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. Closely related to *C. submollis*[200], and included in that species by some botanists[82]. This species is possibly no more than a part of *C. rotundifolia*[204].

used as a flavouring. Root - raw or cooked[27, 33, 52]. It can be grated and added to salads, baked or added to soups, stews etc[183].

tcanta The growing plant is an insect repellent, it repels the cabbage white butterfly so is a good companion for brassicas[20].

dwatta Aperient Carminative Diuretic Emmenagogue Galactagogue Nervine Stimulant TonicAlthough not as medicinally active as wild celery, the cultivated forms of celery also have the same medicinal properties and, when used as an item of the diet, will have a similar effect upon the body. These medicinal uses are as follows:- Wild celery is an aromatic bitter tonic herb that reduces blood pressure, relieves indigestion, stimulates the uterus and is anti-inflammatory[238]. The ripe seeds, herb and root are aperient, carminative, diuretic, emmenagogue, galactagogue, nervine, stimulant and tonic[4, 7, 21, 165]. Wild celery is said to be useful in cases of hysteria, promoting restfulness and sleep and diffusing through the system a mild sustaining influence[4]. The herb should not be prescribed for pregnant women[238]. Seeds purchased for cultivation purposes are often dressed with a fungicide, they should not be used for medicinal purposes[238]. The root is harvested in the autumn and can be used fresh or dried[238]. The whole plant is harvested when fruiting and is usually liquified to extract the juice[238]. The seeds are harvested as they ripen and are dried for later use[238]. An essential oil obtained from the plant has a calming effect on the central nervous system. Some of its constituents have antispasmodic, sedative and anticonvulsant actions. It has been shown to be of value in treating high blood pressure[254]. A homeopathic remedy is made from the herb[9]. It is used in treating rheumatism and kidney complaints[9].

nrakta A cultivated form of garden origin. ksacta Not known in the wild.

propta Seed - surface sow February in a greenhouse. The maincrop can be sown as late as mid-April. Germinates in 2 - 3 weeks at 15°C. Plant out in May. The seed can harbour certain diseases of celery, it is usually treated by seed companies before being sold but if you save your own seed you should make sure that only seed from healthy plants is used[1].

nwatta Prefers a rich moist soil and an open sunny situation[1, 27, 33, 52]. Requires abundant moisture in the growing season otherwise the root will be small and tough[1]. Tolerates a pH in the range 5.2 to 8.3. The root is hardy to about -12°C and can be left in the ground over winter, to be harvested as required[200]. Roots can also be stored in boxes of sand or other such material in a cool dry shed[200]. Celeriac is a form of *A. graveolens* that has been selected for its enlarged edible root. It is occasionally cultivated commercially but more often in the garden or allotment[46, 200], there are some named varieties[183]. Any side-shoots should be removed in order to encourage a larger root[200]. A good companion plant for leeks, tomatoes, French beans and brassicas[18].

6.2.58 *Ulmus procera*

English Elm

5 tlin 9 cyuc 3 kcaak 0 tcan 2 dwat 35 m hkuc hmimhtut cyuti tcup hwicli hrasjutnyik hpa7tli flatprikliw hpa7tmwatli xre7t hjonli

drutta *Ulmus procera* is a deciduous Tree growing to 35 m (114ft) by 15 m (49ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from February to March, and the seeds ripen from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure. It can tolerate atmospheric pollution.

kcaakta Edible Parts: Fruit Inner bark LeavesEdible Uses: TeaLeaves - raw or cooked[2, 179, K]. They can be a little bit bitter, especially if not very young, and have a mucilaginous texture[K]. They make a nice addition to a mixed salad[K]. Immature fruits, used just after they are formed - raw[2, 177]. An aromatic, unusual flavour, leaving the

mouth feeling fresh and the breath smelling pleasant[132]. They contain about 34.4% protein, 28.2% fat, 17% carbohydrate, 5% ash[179]. Inner bark - cooked. A mucilaginous texture[179]. It can be dried, ground into a powder and then used as a thickening in soups etc or mixed with cereals when making bread[2, 177]. A tea is made from the leaves[177].

tcanta Dye Tannin WoodA fibre from the inner bark is very tough[4]. It is used for making mats and ropes[4]. Tannin and a dyestuff are obtained from the inner bark[7]. No details of the colour are given. Wood - close-grained, free from knots, very durable under water, fairly hard, elastic, withstands abrasion and salt water, but does not take a high polish. It is used for water pipes, wheels, mallet heads, ships keels etc[4, 7, 11] and is a good firewood[6].

dwatta Astringent Bach Demulcent Diuretic Eczema Homeopathy Mouthwash Resolvent Skin Tonic VulneryThe dried inner bark is anti-inflammatory, astringent, demulcent, mildly diuretic, resolvent, tonic and vulnerary[4, 7, 9]. It is used both internally and externally in the treatment of diarrhoea, rheumatism, wounds, piles etc and is also used as a mouthwash in the treatment of ulcers[4, 9, 66]. The inner bark is harvested from branches 3 - 4 years old and is dried for later use[9]. The sap has been used in the treatment of baldness[7]. The leaves are astringent and have been powdered then used in the treatment of haemorrhoids[7]. A decoction is used to treat reddened and inflamed skin as well as to relieve various skin disorders[7]. The plant is used in Bach flower remedies - the keywords for prescribing it are 'Occasional feelings of inadequacy', 'Despondency' and 'Exhaustion from over-striving for perfection'[209]. A homeopathic remedy is made from the inner bark[4]. It is used as an astringent[4] and as a treatment for eczema[9].

nrakta Western and southern Europe, including Britain. ksacta Hedgerows, by woods and roads, less frequent in the north[17].

propta Seed - if sown in a cold frame or outdoor seedbed as soon as ripe it usually germinates in a few days. A high proportion of the seed is not viable but seed is normally freely produced and can be sown thickly to take into account the poor viability. Stored seed does not germinate so well and should be sown in early spring. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Plants should not be allowed to grow for more than two years in a nursery bed since they form a tap root and will then move badly. Layering of suckers or coppiced shoots.

nwatta Prefers a fertile soil in full sun[188], but is easily grown in any soil of at least moderate quality so long as it is well drained[1]. Tolerant of atmospheric pollution[4]. The English elm is susceptible to 'Dutch elm disease', a disease that has destroyed the greater part of all the elm trees growing in Britain. Mature trees killed back by the disease will often regrow from suckers, but these too will succumb when they get larger. There is no effective cure (1992) for the problem, but most E. Asian, though not Himalayan, species are resistant to the disease so the potential exists to develop new resistant hybrids with the native species[200]. The various species hybridize freely, the pollen stores well and can be kept for use with species that flower at different times[200]. A food plant for the caterpillars of many lepidoptera species[30], there are 80 species of insects associated with this tree[24]. A good tree for growing grapes into[18].

6.2.59 *Quercus cerris*

Turkey Oak, European turkey oak

5 tlin 9 cyuc 3 kcaak 0 tcan 2 dwat 35 m hkuc hmimhtut cyuti tcup hwicli jltunyikfrp hpa7tli flatprikliw hpa7tmwatli hjonli

drutta *Quercus cerris* is a deciduous Tree growing to 35 m (114ft) by 25 m (82ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in May, and the seeds ripen in September. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils.

The bulbs should be planted fairly deeply[1]. Grows well with most plants, especially roses, carrots, celery, celariac, beet and chamomile, but it inhibits the growth of legumes[18, 20, 54]. This plant is a bad companion for alfalfa, each species negatively affecting the other[201]. Members of this genus are rarely if ever troubled by browsing deer[233].

6.2.55 Lomatium cous

Biscuitroot, Cous biscuitroot
5 tlin 12 cyuc 4 kcaak 1 tcan 0 dwat 0.1 m hkuc
htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatprikliw hpa7tmwatli fyifxre7t hjonli

drutta Lomatium cous is a PERENNIAL growing to 0.1 m (0ft 4in) by 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 6. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: Root SeedEdible Uses: Root - raw or cooked[257]. It is usually peeled before being eaten[257]. The root can be dried and ground into a powder and then be mixed with cereal flours or added as a flavouring to soups etc[46, 61, 95, 105]. When dug up in the spring it has a parsnip-like flavour[161]. Seed[106]. No more details are given, though it is most likely used as an aromatic flavouring in cooked foods[K].

nrakta Western N. America. ksacta Dry often open rocky slopes and flats, often with sagebrush, especially in foothills and lowland, occasionally above the treeline[60].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed can be rather slow to germinate, when sown in the spring it usually takes at least 12 months to germinate. Giving it a period of cold stratification might reduce this time. The seedlings need to be pricked out into individual pots as soon as they are large enough to handle, and should be planted out into their permanent positions in the summer. Fresh seed can be sown immediately in situ. Division may be possible in spring or autumn.

nwatta We have almost no information on this species and do not know if it will be hardy in Britain, though judging by its native range it should succeed outdoors in much of the country. It can be assumed that plants will require a dry to moist but well-drained soil in a sunny position. Polymorphic[60]. This is a taxonomically very difficult genus, many of the species now included in it have at times been included in other genera[60]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

6.2.56 Rumex scutatus

Buckler-Leaved Sorrel, French sorrel
5 tlin 9 cyuc 4 kcaak 2 tcan 1 dwat 0.6 m hkuc
hmimhtut cyutli hqtaccup hwicli hrasjlutnyik hpa7tli flatprikliw hpa7tmwatli xre7t hjonli

drutta Rumex scutatus is a PERENNIAL growing to 0.6 m (2ft) by 0.6 m (2ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from June to July, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure.

pcista Plants can contain quite high levels of oxalic acid, which is what gives the leaves of many members of this genus an acid-lemon flavour. Perfectly alright in small quantities, the leaves should not be eaten in large amounts since the oxalic acid can lock-up other nutrients in the food, especially calcium, thus causing mineral deficiencies. The oxalic acid

content will be reduced if the plant is cooked. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked[2, 4, 12, 14, 27, 33]. A delicious lemon-like flavour[183], most people find them overpowering if used in quantity, but they make a delightful addition to the salad bowl and can also be used as a pot-herb[K]. This species has less acid leaves and so is often preferred to sorrel (R. acetosa)[238]. The leaves should be used sparingly due to the oxalic acid content[4].

tcanta DyeThe cultivar 'Silver Shield' makes a good, if rampant, ground cover beside paths and at the front of borders[238]. Although no specific mention has been made for this species, dark green to brown and dark grey dyes can be obtained from the roots of many species in this genus. They do not need a mordant[168]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Antiscorbutic Astringent Diuretic Laxative RefrigerantThe leaves are antiscorbutic, astringent, diuretic, laxative and refrigerant[4, 238]. They are rarely used as a specifically medicinal plant.

nrakta Europe. Occasionally naturalized in Britain[17]. ksacta Old walls and mountain pastures[17, 244].

propta Seed - sow spring in a cold frame. Germination is rapid, the seedlings can be pricked out into individual pots when they are large enough to handle and are planted out in early summer[K]. It should also be possible to sow the seed in situ in mid spring[K]. Division in spring. Division is easy at any time in the growing season, though the plants establish better in the spring[K]. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta A very easily grown plant, succeeding in most soils but preferring a moist moderately fertile well-drained soil in a sunny position[200]. Prefers a rather dry soil[4, 27]. Established plants are drought tolerant[200]. Plants often self-sow freely in the garden[K]. Buckler-leaved sorrel is occasionally cultivated for its edible leaves[61, 105]. There are some named varieties that have been selected for their ornamental value[238]. A food plant for the caterpillars of many species of butterfly[30]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fleshy. Thick or swollen - fibrous or tap root [2-1].

6.2.57 Apium graveolens rapaceum

Celeriac
5 tlin 9 cyuc 4 kcaak 0 tcan 2 dwat 0.6 m hkuc
hmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliw hpa7tmwatli fyifxre7t hjonli

drutta Apium graveolens rapaceum is a BIENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from June to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland). It prefers moist soil.

pcista If the plant is infected with the fungus *Sclerotinia sclerotiorum*, skin contact with the sap can cause dermatitis in sensitive people[65].

kcakta Edible Parts: Leaves Root SeedEdible Uses: CondimentLeaves - used as a flavouring in soups etc[200]. They can be eaten raw but have a very strong flavour[52]. Seed - a flavouring. An essential oil from the seed is also

6.2.34 Sambucus nigra

Elderberry - European Elder, Black elderberry, American black elderberry, Blue elderberry, Europea
5 tlin 7 cyuc 4 kcaak 5 tcan 3 dwat 6 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliw hpa7tmwatli xre7t hjonli

drutta Sambucus nigra is a deciduous Shrub growing to 6 m (19ft) by 6 m (19ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf from March to November, in flower from June to July, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure. It can tolerate atmospheric pollution.

pcista The leaves and stems are poisonous[9, 76]. The fruit of many species (although no records have been seen for this species) has been known to cause stomach upsets to some people. Any toxin the fruit might contain is liable to be of very low toxicity and is destroyed when the fruit is cooked[65, 76].

kcakta Edible Parts: Flowers FruitEdible Uses: Colouring TeaFruit - raw or cooked[2, 3, 5, 46, 61]. The flavour of the raw fruit is not acceptable to many tastes, though when cooked it makes delicious jams, preserves, pies and so forth[K]. It can be used fresh or dried, the dried fruit being less bitter[12, 183, 238]. The fruit is used to add flavour and colour to preserves, jams, pies, sauces, chutneys etc, it is also often used to make wine[13, 183]. The fruit is about 8mm in diameter and is borne in large clusters[200]. Some caution is advised, see the notes above on toxicity. Flowers - raw or cooked[2, 5, 12, 53]. They can also be dried for later use[21]. The flowers are crisp and somewhat juicy, they have an aromatic smell and flavour and are delicious raw as a refreshing snack on a summers day, though look out for the insects[K]. The flowers are used to add a muscatel flavour to stewed fruits, jellies and jams (especially gooseberry jam)[238]. They are often used to make a sparkling wine[183]. A sweet tea is made from the dried flowers[21, 183]. The leaves are used to impart a green colouring to oils and fats[183].

tcanta Compost Cosmetic Dye Fungicide Hedge Hedge Insecticide Litmus Microscope Musical Pioneer Pipes Repellent WoodThe plant is a valuable addition to the compost heap[14, 18], its flowers are an alternative ingredient of 'QR' herbal compost activator[32] and the roots of the plant improve fermentation of the compost heap when growing nearby[18]. The leaves are used as an insect repellent[4, 6, 14, 66], very effective when rubbed on the skin though they do impart their own unique fragrance[K]. They can be powdered and placed amongst plants to act as a deterrent[14], or made into a spray when they act as an insecticide[7]. This is prepared by boiling 3 - 4 handfuls of leaves in a litre of water, then straining and allowing to cool before applying[201]. Effective against many insects, it also treats various fungal infections such as leaf rot and powdery mildew[201]. The dried flowering shoots are used to repel insects, rodents etc[101]. The flowers are used in skin lotions, oils and ointments[238]. Tolerant of salt-laden gases, this species can be grown as a shelter hedge in exposed maritime areas[29, 75], it is rather bare in the winter though[K]. This is an excellent pioneer species to use when re-establishing woodlands. It is very tough and wind-resistant, grows quickly and provides shelter for longer-lived and taller woodland species to establish. It will generally maintain itself in the developing woodland, though usually in the sunnier positions[K]. A dye is obtained from the fruit and the bark[13, 15]. The bark of older branches and the root have been used as an ingredient in dyeing black[4]. A green dye is obtained from the leaves when alum is used as a mordant[4]. The berries yield various shades of blue and purple dyes[4]. They have also been used as a hair dye, turning the hair black[4]. The blue colouring matter from the fruit can be used as a litmus to test if something is acid or alkaline. It turns green in an alkaline solution and red in an acid solution[4]. The pith in the stems of young branches pushes out easily and the hollow stems thus made have been used as pipes for blowing air into a fire[4]. They

can also be made into musical instruments[4]. The pith of the wood is used for making microscope slides and also for treating burns and scalds[46, 61, 100]. The mature wood is white and fine-grained. It is easily cut and polishes well[4]. Valued highly by carpenters, it has many uses, for making skewers, mathematical instruments, toys etc[4, 13, 100, 244]. A good forage for animals: mule deer, elk, sheep and small birds. It is classified as nesting habitat for many birds, including hummingbirds, warblers, and vireos. Elderberries are a favorite food for migrating band-tailed pigeons in northern California.

dwatta Antiinflammatory Aperient Diaphoretic Diuretic Emetic Emollient Expectorant Galactagogue Haemostatic Laxative Ophthalmic Purgative Salve StimulantElder has a very long history of household use as a medicinal herb and is also much used by herbalists[4]. The plant has been called 'the medicine chest of country people' [4]. The flowers are the main part used in modern herbalism, though all parts of the plant have been used at times[238]. Stimulant[9, 53, 165]. The inner bark is collected from young trees in the autumn and is best sun-dried[4]. It is diuretic, a strong purgative and in large doses emetic[4, 7]. It is used in the treatment of constipation and arthritic conditions[238]. An emollient ointment is made from the green inner bark[4]. The leaves can be used both fresh or dry. For drying, they are harvested in periods of fine weather during June and July. The leaves are purgative, but are more auroseous than the bark[4]. They are also diaphoretic, diuretic, expectorant and haemostatic[4, 7]. The juice is said to be a good treatment for inflamed eyes[4]. An ointment made from the leaves is emollient and is used in the treatment of bruises, sprains, chilblains, wounds etc[4]. The fresh flowers are used in the distillation of 'Elder Flower Water'. The flowers can be preserved with salt to make them available for distillation later in the season[4]. The water is mildly astringent and a gentle stimulant. It is mainly used as a vehicle for eye and skin lotions[4]. The dried flowers are diaphoretic, diuretic, expectorant, galactagogue and pectoral[4, 7]. An infusion is very effective in the treatment of chest complaints and is also used to bathe inflamed eyes[4]. The infusion is also a very good spring tonic and blood cleanser[4]. Externally the flowers are used in poultices to ease pain and abate inflammation[4]. Used as an ointment, it treats chilblains, burns, wounds, scalds etc[4]. The fruit is depurative, weakly diaphoretic and gently laxative[4, 7]. A tea made from the dried berries is said to be a good remedy for colic and diarrhoea[4]. The fruit is widely used for making wines, preserves etc., and these are said to retain the medicinal properties of the fruit[4]. The pith of young stems is used in treating burns and scalds[46, 61, 100]. The root is no longer used in herbal medicine but it formerly had a high reputation as an emetic and purgative that was very effective against dropsy[4]. A homeopathic remedy is made from the fresh inner bark of young branches[4]. It relieves asthmatic symptoms and spurious croup in children[4]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve *Sambucus nigra* for cough and bronchitis, fevers and colds (see [302] for critics of commission E).

nrakta Europe, including Britain, from Scandanavia south and east to N. Africa and W. Asia. ksacta Hedgerows, scrub, woods, roadsides, waste places etc, especially on disturbed base-rich and nitrogen rich soils[9, 17].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame, when it should germinate in early spring. Stored seed can be sown in the spring in a cold frame but will probably germinate better if it is given 2 months warm followed by 2 months cold stratification first[78, 98, 113]. Prick out the seedlings into individual pots when they are large enough to handle. If good growth is made, the young plants can be placed in their permanent positions during the early summer. Otherwise, either put them in a sheltered nursery bed, or keep them in their pots in a sheltered position and plant them out in spring of the following year. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame[78]. Cuttings of mature wood of the current season's growth, 15 - 20cm with a heel, late autumn in a frame or a sheltered outdoor bed[78]. Division of suckers in the dormant season.

nwatta Industrial Crop: Dye Industrial Crop: Medicinal Management: Standard Minor Global CropLandscape Uses:Border, Container, Massing, Pollard, Standard, Seashore, Specimen. A very easily grown plant, it toler-

ates most soils and situations[11, 28, 98], growing well on chalk[28, 98, 186], but prefers a moist loamy soil[200]. Grows well in heavy clay soils. Tolerates some shade but fruits better in a sunny position[37, 200]. Tolerates atmospheric pollution and coastal situations[200]. Another report says that it is intolerant of very smoky atmospheres[186]. The elder is very occasionally cultivated for its edible fruit, there are some named varieties though most of these have been developed for their ornamental value[182]. The subspecies *S. nigra alba* has white/green fruits that are nicer than the type species and are quite nice raw[K]. The elder also has a very long history of folk use, both medicinally and for a wide range of other uses. All in all it is a very valuable plant to have in the garden. The leaves often begin to open as early as January and are fully open in April[186]. The leaves fall in October/November in exposed sites, later in sheltered positions[186]. Young stems can be killed by late frosts but they are soon replaced from the ground level[186]. Very tolerant of pruning, plants can be cut back to ground level and will regrow from the base[186]. The flowers have a sweet, almost overpowering smell, not exactly pleasant when inhaled near to for it has fishy undertones, but from a distance its musky scent is appealing[245]. Very resistant to the predations of rabbits[17, 186]. The flowers are very attractive to insects[186]. The fruit is very attractive to birds[186] and this can draw them away from other cultivated fruits[14, 186]. The elder is an early colonizer of derelict land, the seed arriving in the defecations of birds and mammals[186]. It is a very good pioneer species for re-establishing woodlands. Plants in this genus are notably resistant to honey fungus[200]. Special Features:Attractive foliage, Not North American native, Attractive flowers or blooms. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is suckering with new plants from underground runners away from the plant [2-1].

6.2.35 Mespilus germanica

Medlar
5 tlin 8 cyuc 4 kcaak 1 tcan 1 dwat 6 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwattli fyfixre7t hjonli

drutta *Mespilus germanica* is a deciduous Tree growing to 6 m (19ft) by 6 m (19ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from May to June, and the seeds ripen in November. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

pcista The seeds contain the toxic hydrocyanic acid (the substance that gives almonds their flavour) and should not be eaten in quantity[7].

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 3, 5, 7, 12]. The fruit does not always ripen fully in cooler temperate zones such as Britain. However it can be harvested in late autumn (preferably after it has had some frost) whilst still hard and then needs to be bletted before it can be eaten raw. This entails storing it, stalk end upwards, in a cool place for a short while until it is on the point of (but not quite) rotting[200], a state described as incipient decay. At this stage the flesh turns from white to brown, becomes very soft and is quite sweet with an absolutely delicious flavour that somewhat resembles a luscious tropical fruit[K]. The fruit of the wild species is up to 25mm in diameter, though some cultivars can be 65mm or more in diameter[200].

tcanta WoodWood - hard, flexible[100].

dwatta Astringent LaxativeThe pulp of the fruit is laxative[7]. The leaves are astringent[7]. The seed is lithontripic[7]. It is ground up for use, but caution should be employed since the seeds contain the toxin hydrocyanic acid[7]. The bark has been used as a substitute for quinine, but with uncertain results[7].

nrakta S.E. Europe to W Asia. Occasionally naturalized in Britain. ksacta Woods and hedgerows[7, 17].

propta Seed - best sown as soon as it is ripe in late autumn in a cold frame[78]. The seed has a very hard and impermeable seedcoat and will not usually germinate until it has gone through two winters. Commercially, such seeds are soaked for a short while in sulphuric acid to break down the seed coat and allow the seed to take up moisture, this is a very delicate procedure and difficult to do on a small scale. A home gardener could try soaking the seed for 24 hours in warm water then cold stratifying it for 2 - 3 months at 1 - 5°C before sowing it. Alternatively, if you can harvest the seed green (as soon as it is mature but before the seed coat has dried and hardened), then sow it immediately in a cold frame you might reduce the time needed for it to germinate. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the cold frame for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of mature wood, November in a cold frame. Poor percentage. Layering in autumn or early spring. Takes 18 months[78].

nwatta Succeeds in most soils[11], preferring one that is moist and well-drained[1, 37, 200]. Prefers a sunny position[1, 3] and a fertile soil[188]. Occasionally cultivated for its edible fruit, there are some named varieties[183, 200]. The plant is heat tolerant in zones 9 through 6. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

6.2.36 Phyllostachys aureosulcata

Yellow-Groove Bamboo
5 tlin 11 cyuc 4 kcaak 2 tcan 0 dwat 6 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwattli xre7t hjonli

drutta *Phyllostachys aureosulcata* is an evergreen Bamboo growing to 6 m (19ft) by 6 m (19ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: ShootsStemEdible Uses: Young shoots - raw or cooked. They have very little bitterness, even when eaten raw[183, 195]. The canes of plants grown in Britain are about 25mm in diameter[K], though they can reach up to 4cm in diameter[266]. The shoots are harvested in the spring when they are about 8cm above the ground, cutting them about 5cm below soil level. Young culms are green with yellow grooves.

tcanta Plant support WoodThe canes are not of the best quality but make good plant supports[195]. A good screen plant.

nrakta E. Asia - N.E. China. ksacta Not known

propta Seed - surface sow as soon as it is ripe in a greenhouse at about 20°C. Do not allow the compost to dry out. Germination usually takes place fairly quickly so long as the seed is of good quality, though it can take 3 - 6 months. Grow on in a lightly shaded place in the greenhouse until large enough to plant out. Seed is rarely available. Division in

cholagogue, depurative, strongly diuretic, hepatic, laxative, stomachic and tonic[4, 7, 9, 21, 54, 165, 176, 222, 238]. The root is also experimentally cholagogue, hypoglycaemic and a weak antibiotic against yeast infections[222]. The dried root has a weaker action[222]. The roots can be used fresh or dried and should be harvested in the autumn when 2 years old[4]. The leaves are harvested in the spring when the plant is in flower and can be dried for later use[9]. A tea can be made from the leaves or, more commonly, from the roots[213]. The plant is used internally in the treatment of gall bladder and urinary disorders, gallstones, jaundice, cirrhosis, dyspepsia with constipation, oedema associated with high blood pressure and heart weakness, chronic joint and skin complaints, gout, eczema and acne[238]. The plant has an antibacterial action, inhibiting the growth of *Staphylococcus aureus*, *Pneumococci*, *Meningococci*, *Bacillus dysenteriae*, *B. typhi*, *C. diphtheriae*, *Proteus* etc[176]. The latex contained in the plant sap can be used to remove corns, warts and verruca[e7]. The latex has a specific action on inflammations of the gall bladder and is also believed to remove stones in the liver[7]. A tea made from the leaves is laxative[222]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve *Taraxacum officinale* for dyspepsia, urinary tract infections, liver and gallbladder complaints, appetite loss (see [302] for critics of commission E).

nrakta Throughout most of the northern hemisphere, including Britain. ksacta A very common weed of grassland and cultivated ground[17].

propta Seed - sow spring in a cold frame and either surface-sow or only just cover the seed. Make sure the compost does not dry out. Germination should take place within 2 weeks, though 2 weeks cold stratification may improve germination. Prick out the seedlings into individual pots when they are large enough to handle, choosing relatively deep pots to accommodate the tap root. Plant them out in early summer. Division in early spring as the plant comes into growth.

nwatta A very easily grown plant, it succeeds in most soils[1], though it prefers a well-drained humus-rich neutral to alkaline soil in full sun or light shade[37, 238]. A very hardy plant, tolerating temperatures down to at least -29°C[238]. The dandelion is a common weed of lawns and grassy places. Though it has a bitter flavour, the plant is often cultivated as a salad crop and as a medicinal plant, especially in parts of Europe. There are some named varieties with larger, more tender and less bitter leaves[183]. Dandelions can provide edible leaves all year round, especially if they are given a small amount of protection in the winter[K]. A valuable bee plant and an important food plant for the caterpillars of many butterfly and moth species[4, 24, 30, 54], it grows well in a spring meadow[24]. A deep rooting plant, it has roots up to 1 metre long and brings up nutrients from lower levels of the soil[201]. An excellent plant to grow in lawns, if the lawn is cut no more than fortnightly then the dandelions will provide a good quantity of edible leaves[K]. Grows well with alfalfa[18, 201]. Another report says that it inhibits the growth of nearby plants[54]. This is probably a reference to the fact that the plant gives off ethylene gas, this gas is a hormone that promotes the premature ripening of fruits and also induces the premature fruiting of plants, thereby stunting their growth[14, 18]. *T. officinale* is not a valid name for this species, but no valid name has as yet been ascribed to it[200]. This is actually an aggregate species of many hundreds of slightly differing species. Most seed production is apomictic which means that plants produce seed non-sexually and all seedlings are clones of the parent, thus small differences are maintained. Special Features:Edible, Not North American native, Invasive, Naturalizing, Suitable for dried flowers, Extended bloom season in Zones 9A and above. The plant is heat tolerant in zones 8 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown

above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

6.2.54 Allium porrum

Leek, Garden leek
5 tlin 9 cyuc 4 kcaak 0 tcan 2 dwat 0.9 m hkuc
htut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikliwis hpa7tmwattli xre7t hjonli

drutta *Allium porrum* is a BULB growing to 0.9 m (3ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers moist soil.

pcista Although no individual reports regarding this species have been seen, there have been cases of poisoning caused by the consumption, in large quantities and by some mammals, of certain members of this genus. Dogs seem to be particularly susceptible[76].

kcakta Edible Parts: Flowers Leaves RootEdible Uses: The leaves and long white blanched stem are eaten cooked[2, 16, 37, 183]. They can also be cut into thin slices and be added to salads[183]. A mild onion flavour with a delightful sweetness[183, K]. Bulb - raw or cooked. The bulb is produced in the plants second year of growth (that is, after it is normally harvested). The bulb is somewhat larger if the plant is prevented from flowering[K]. Flowers - raw. Used as a garnish on salads, though they are rather on the dry side and less pleasant than many other members of the genus[K].

tcanta RepellentThe juice of the plant is used as a moth repellent. The whole plant is said to repel insects and moles[20].

dwatta Anthelmintic Antiasthmatic Anticholesterolemic Antiseptic Antispasmodic Cholagogue Diaphoretic Diuretic Expectorant Febrifuge Stimulant Stings Stomachic Tonic VasodilatorThis species has the same medicinal virtues as garlic, but in a much milder and less effective form[238]. These virtues are as follows:- Garlic has a very long folk history of use in a wide range of ailments, particularly ailments such as ringworm, Candida and vaginitis where its fungicidal, antiseptic, tonic and parasitocidal properties have proved of benefit[218]. It is also said to have anticancer activity[218]. Daily use of garlic in the diet has been shown to have a very beneficial effect on the body, especially the blood system and the heart. For example, demographic studies suggest that garlic is responsible for the low incidence of arteriosclerosis in areas of Italy and Spain where consumption of the bulb is heavy[222]. The bulb is said to be anthelmintic, antiasthmatic, anticholesterolemic, antiseptic, antispasmodic, cholagogue, diaphoretic, diuretic, expectorant, febrifuge, stimulant, stomachic, tonic, vasodilator[4, 9, 14, 21, 46, 165]. The crushed bulb may be applied as a poultice to ease the pain of bites, stings etc[4, 9, 14, 21].

nrakta Original habitat is obscure. ksacta Not known in wild.

propta Seed - for an early crop, or for larger plants, sow the seed in early spring in a greenhouse and plant out in May. For smaller or later plants, sow April in an outdoor seedbed and plant out as space permits in July or even August.

nwatta Prefers a sunny position in a light well-drained soil[1] but succeeds in most soils[16]. Grows well in heavy clay soils. Prefers an open situation[1, 37]. Does best in a soil that was well fed for a previous crop[1]. Tolerates a pH in the range 5.2 to 8.3. The leek is a widely cultivated vegetable, there are many named varieties[183]. Young plants are often planted quite deeply in the soil (8 - 10cm deep) in order to blanch the lower stem, it is also a common practice to earth up the growing plants in order to blanch right the way up the stems. Whilst this does make the stems more tender, it also results in a loss of minerals and vitamins. Although commonly treated as a biennial, this plant is a true perennial, perennating by means of small lateral growths and often developing a roundish bulb at the base of the main growth[1]. A relatively slow-growing plant, it can be interplanted with faster maturing species such as lettuces[201].

enough to handle and plant them out in the summer. Division in spring[31, 56]. Very quick and easy, it can be done successfully at almost any time in the growing season[K]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Landscape Uses:Border, Container, Foundation, Ground cover, Massing, Woodland garden. Requires a moist to wet soil or shallow water, partial shade and a sheltered position[1, 31, 56, 238]. Whilst it grows best in a bog garden, it will succeed in moist garden borders[233] and has also grown fairly well in a dry soil in Cornwall[K]. It succeeds in full shade[208]. Plants are hardy to about -15°C[187], the top growth is killed back by frost though the roots are much hardier. Even the roots, though, can be killed in severe winters[56]. A very ornamental plant, there are some named varieties[187]. 'Chameleon' has very attractively variegated leaves with the same flavour as the species[K]. The bruised leaves emit a strong citrus smell rather like orange peel[K]. Plants have a widely spreading root system and are very invasive, though they are easier to control in drier soils[200]. Creeps harmlessly between ferns[187]. Cultivated as a salad crop in Vietnam[103] and in W. China[187]. Plants seem to be immune to the predations of rabbits[233]. Plants growing in an area with a high rabbit population were not eaten by them although other plants growing nearby were attacked[K]. Special Features: Attractive foliage, Fragrant foliage, Not North American native, Invasive, Naturalizing, Wetlands plant, Inconspicuous flowers or blooms. The plant is heat tolerant in zones 12 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

6.2.52 *Diplotaxis tenuifolia*

Perennial Wall Rocket

5 tlin 9 cyuc 4 kcaak 0 tcan 0 dwat 0.6 m hkuc hmimhtut cyutli kyucotp hwicli hrasjlutnyik hpa7tli flatprikliw hpa7tmwatli xre7t hjonli

drutta *Diplotaxis tenuifolia* is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to September, and the seeds ripen from June to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw. Used in salads, they are very strongly flavoured or cress[217]. The leaves have a hot flavour, very similar to rocket (*Eruca vesicaria sativa*) but more strongly flavoured - they make an excellent addition to a mixed salad but are too strong to be used in quantity on their own[K]. The plant is very productive, producing leaves from early spring until the autumn[K].

nrakta Southern and central Europe, possibly including Britain. ksacta Old walls and waste places in S. England, a casual further north[17]. This plant is doubtfully native in Britain[17].

propta Seed - best sown in situ as soon as it is ripe, though it can also be sown in situ in the spring. The seed usually germinates in the autumn.

nwatta See the plants native habitat for ideas on its cultivation needs[K]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown

above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2].

6.2.53 *Taraxacum officinale*

Dandelion - Kukraundha, Kanphool, Common dandelion, Dandelion

5 tlin 9 cyuc 4 kcaak 3 tcan 3 dwat 0.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliw hpa7tmwatli fyfjxre7t hjonli

drutta *Taraxacum officinale* is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.3 m (1ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to May, and the seeds ripen from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects, Apomictic (reproduce by seeds formed without sexual fusion). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

pcasta This plant has been mentioned in various books on poisonous plants but any possible toxins will be of very low concentration and toxicity[10]. There are reports that some people have suffered dermatitis as a result of touching the plant, this is probably caused by the latex in the leaves and stems[222].

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Coffee TeaLeaves - raw or cooked[1, 2, 4, 5, 7, 9, 12, 14, 33, 154]. When used in salads, they are rather bitter, though less so in the winter. Tender young leaves are considerably less bitter than older leaves[K]. The leaves are often blanched (by excluding light from the growing plant) before use[183]. This will make them less bitter, but they will also contain less vitamins and minerals[K]. A very nutritious food, 100g of the raw leaves contain about 2.7g. protein, 9.2g. carbohydrate, 187mg Calcium, 66mg phosphorus, 3.1mg iron, 76mg sodium, 397mg potassium, 36mg magnesium, 14000iu vitamin A, 0.19mg vitamin B1, 0.26mg vitamin B2, 35mg vitamin C[173]. Root - raw or cooked[5, 9, 12, 183]. Bitter. A turnip-like flavour[159]. Flowers - raw or cooked[102, 159]. A rather bitter flavour[K], the unopened flower buds can be used in fritters[183] and they can also be preserved in vinegar and used like capers[7]. Both the leaves and the roots are used to flavour herbal beers and soft drinks such as 'Dandelion and Burdock'[238]. The roots of 2 year old plants are harvested in the autumn, dried and roasted to make a very good coffee substitute[2, 4, 5, 12, 54, 159]. It is caffeine-free[213]. A pleasant tea is made from the flowers[12, 102]. They are also used to make wine - all green parts should be removed when making wine to prevent a bitter flavour[238]. The leaves and the roots can also be used to make tea.

tcanta Compost Cosmetic Dye Fruit ripening Latex MiscellanyThe flowers are an ingredient of 'QR' herbal compost activator[32]. This is a dried and powdered mixture of several herbs that can be added to a compost heap in order to speed up bacterial activity and thus shorten the time needed to make the compost[K]. A liquid plant feed can be made from the root and leaves[54]. A low quality latex, which can be used for making rubber, can be obtained from the roots of this plant. A magenta-brown dye is obtained from the root[141]. The plant releases ethylene gas, this stunts the growth of nearby plants and causes premature ripening of fruits[14, 18]. A distilled water made from the ligules (thin appendages at the base of the leaf blades) is used cosmetically to clear the skin and is particularly effective in fading freckles[7]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Aperient Cholagogue Depurative Diuretic Eczema Hepatic Hypoglycaemic Laxative Miscellany Stomachic Tonic Urinary Vitamin C WartsThe dandelion is a commonly used herbal remedy. It is especially effective and valuable as a diuretic because it contains high levels of potassium salts and therefore can replace the potassium that is lost from the body when diuretics are used[238]. All parts of the plant, but especially the root, are slightly aperient,

spring as new growth commences. Divisions from the open ground do not transplant well, so will need careful treatment and nurturing under cover in pots until at least late spring[238]. Division is best carried out in wet weather and small divisions will establish better than large clumps[238]. Another report says that you can take large divisions from established clumps and transfer them straight to their permanent positions, misting or drenching them frequently until they are established[200]. Basal cane cuttings in spring.

nwatta Requires a rich damp soil in a sheltered position. One report says that this is a very hardy plant, withstanding temperatures down to about -20°C, whilst another says that it dislikes prolonged exposure to hard frosts[200]. This species is notably resistant to honey fungus[200]. Plants only flower at intervals of many years. When they do come into flower most of the plants energies are directed into producing seed and consequently the plant is severely weakened. They sometimes die after flowering, but if left alone they will usually recover though they will look very poorly for a few years. If fed with artificial NPK fertilizers at this time the plants are more likely to die[122]. This is a good companion species to grow in a woodland because the plants are shallow rooted and do not compete with deep rooted trees[195]. The rootstock is running but only slightly so in the cooler climate of Britain. In warmer climates (e.g. US South West) it can spread indefinitely if not confined with an underground barrier. The bottoms of some culms have large kinks in them, this limits their use for timber etc but makes them more ornamental. Heat zone: 12-3.

6.2.37 *Smilax china*

China Root

5 tlin 9 cyuc 4 kcaak 0 tcan 3 dwat 4.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliw hpa7tmwatli nyanhjen hjonli

drutta *Smilax china* is a deciduous Climber growing to 4.5 m (14ft 9in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in May, and the seeds ripen in October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). . The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit Leaves RootEdible Uses: Rutin TeaRoot - cooked[4, 105, 177]. Rich in starch[2], the large and fleshy roots can be dried and ground into a powder[11]. The root is harvested by severing larger roots near the crown and leaving the smaller roots to grow on[238]. Young shoots and leaves - raw or cooked[105, 159, 177, 179]. Used as a potherb[183]. The leaves are said to contain rutin, but no details of quantity were given[218]. Fruit - raw. Eaten to quench the thirst[105, 177, 183]. The fruit is about 9mm in diameter[200]. A tea is made from the leaves[177, 179, 183].

tcanta DyeA yellow dye is made from the root and leaves when alum is used as a mordant[4, 178]. With iron sulphate, the colour is brown[4].

dwatta Alterative Antipsoriatic Antiscrophulatic Carmine Depurative Diaphoretic Diuretic Skin Tonic Urinary VDThe root is alterative, antiscrophulatic, carminative, depurative, diaphoretic, diuretic and tonic[1, 4, 11, 147, 174, 178, 218]. It is considered useful when taken internally in the treatment of old syphilitic cases and is also used for certain skin diseases, including psoriasis, rheumatoid arthritis, gout, enteritis, urinary tract infections, skin ulcers etc[4, 238]. Large doses can cause nausea and vomiting, which is valuable in weakened and depraved conditions due to a poisoned state of the blood[4]. The root is harvested in the autumn and dried for later use.

nrakta E. Asia - China, Japan. ksacta Shrub thickets[147] in hills and mountains[58]. Forests, thickets, hill-sides, grassy slopes, shaded places along valleys or streams from near sea level to 2000 metres[266].

propta Seed - sow March in a warm greenhouse[1]. This note probably refers to the tropical members of the genus, seeds of plants from cooler areas seem to require a period of cold stratification, some species taking 2 or more years

to germinate[K]. We sow the seed of temperate species in a cold frame as soon as we receive it, and would sow the seed as soon as it is ripe if we could obtain it then[K]. When the seedlings eventually germinate, prick them out into individual pots when they are large enough to handle and grow them on in the greenhouse for at least their first year, though we normally grow them on in pots for 2 years. Plant them out into their permanent positions in early summer. Division in early spring as new growth begins[238]. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer. Cuttings of half-ripe shoots, July in a frame[238].

nwatta Succeeds in most well-drained soils in sun or semi-shade[200]. Hardy to about -15°C[200]. A climbing plant, supporting itself by means of tendrils and thorns as it scrambles through small trees and shrubs. A young plant is growing and thriving close to a west-facing wall at Kew Botanical gardens[K]. This species is not the true 'China root' of medicine, see the record for *S. pseudo-china*[178]. Dioecious. Male and female plants must be grown if seed is required.

6.2.38 *Crataegus pinnatifida major*

Chinese Haw

5 tlin 9 cyuc 4 kcaak 2 tcan 3 dwat m hkuc hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikrip hpa7tli flatprikliwslip hpa7tmwatli xre7t hjonli

drutta *Crataegus pinnatifida major* is a deciduous Tree growing to 7.5 m (24ft 7in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[3, 105, 177]. A pleasant flavour; it is sold in local markets in China[178]. The fruit can be used in making pies, preserves, etc. and can also be dried for later use. A good size, it is up to 25mm in diameter[200]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Anticholesterolemic Cardiotonic Hypotensive Stomachic VasodilatorThe fruits and flowers of hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222]. The fruits are anticholesterolemic, cardiotonic, stomachic and vasodilator. Their use improves the blood circulation and lowers blood pressure[176]. The fruits are used in the treatment of dyspepsia, stagnation of fatty foods, abdominal fullness, retention of lochia, amenorrhoea, postpartum abdominal pain, hypertension and coronary heart disease[176].

nrakta E. Asia - China. ksacta Riverbanks, on sandy soils or stony slopes[74].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed

but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. A very ornamental plant, this sub-species is widely cultivated for its edible fruit in China[266], it is larger than the type species[46, 178, 200].

6.2.39 Lomatium macrocarpum

Bigseed Biscuitroot

5 tlin 10 cyuc 4 kcaak 2 tcan 2 dwat m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatprikwiw hpa7tmwatli fyfjxre7t hjonli

drutta Lomatium macrocarpum is a PERENNIAL growing to 0.5 m (1ft 8in). The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kckaak Edible Parts: Root SeedEdible Uses: TeaRoot - raw or cooked[257]. A staple food for a number of native North American Indian tribes[257]. The root is usually peeled before being cooked or eaten[257]. It can be dried and ground into a powder and then used to make cakes etc[105, 161, 183]. Seed - raw or cooked. Very nutritious, they can also be ground into a powder[183] and then used with cereal flours when making bread, cakes etc, or be used as a flavouring in soups etc[257]. The seed is very small, but quite easy to harvest[183, K]. A tea can be made from the leaves, stems and flowers[183].

tcanta IncenseThe root has been dried then burnt as a ceremonial incense[257].

dwatta Infertility Pectoral Poultice Sedative TonicAn infusion of the roots has been used as a general strengthener for a weakened patient[257]. The infusion is also used as a treatment for colds, influenza and bronchitis[257]. The root has been chewed and the juice swallowed as a treatment for sore throats[257]. The root has been eaten by childless couples, especially older people, in order to help them conceive[257]. A poultice made from the boiled root has been used to treat swellings[257]. The leaves have been used as a padding in a child's cradle to encourage it to sleep more[257].

nrakta Western N. America - British Columbia to California. ksacta Open rocky hills and plains, not extending much into the mountains[60].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed can be rather slow to germinate, when sown in the spring it usually takes at least 12 months to germinate. Giving it a period of cold stratification might reduce this time. The seedlings need to be pricked out into individual pots as soon as they are large enough to handle, and should

be planted out into their permanent positions in the summer. Fresh seed can be sown immediately in situ. Division may be possible in spring or autumn.

nwatta We have almost no information on this species and do not know if it will be hardy in Britain, though judging by its native range it should succeed outdoors in much of the country. It can be assumed that plants will require a dry to moist but well-drained soil in a sunny position. Polymorphic[60]. This is a taxonomically very difficult genus, many of the species now included in it have at times been included in other genera[60]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

6.2.40 Berberis aristata

Chitra, Indian Barberry or Tree Turmeric

5 tlin 9 cyuc 4 kcaak 3 tcan 3 dwat 3.5 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli flatprikwiw hpa7tmwatli fyfjxre7t hjonli

drutta Berberis aristata is an evergreen Shrub growing to 3.5 m (11ft 6in) at a medium rate. See above for USDA hardness. It is hardy to UK zone 6 and is not frost tender. It is in leaf all year, in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kckaak Edible Parts: Flowers FruitEdible Uses: Fruit - raw or cooked[145]. A well-flavoured fruit, it has a sweet taste with a blend of acid, though there is a slight bitterness caused by the seeds[194, K]. The fruit is much liked by children[194, K]. It is dried and used like raisins in India[2, 3, 177, 183]. The fruit contains about 2.3% protein, 12% sugars, 2% ash, 0.6% tannin, 0.4% pectin[194]. There is 4.6mg vitamin C per 100ml of juice[194]. The fruit is about 7mm x 4mm[194] - it can be up to 10mm long[200]. Plants in the wild yield about 650g of fruit in 4 pickings[194]. Flower buds - added to sauces[177, 183].

tcanta Dye Fuel TanninA yellow dye is obtained from the root and the stem[46, 61, 272]. An important source of dyestuff and tannin, it is perhaps one of the best tannin dyes available in India[194]. The wood is used as a fuel[146]. The spiny branches are used for making fencing around fields[272].

dwatta Alterative Antibacterial Antiperiodic Bitter Cancer Deobstruent Diaphoretic Dysentery Laxative Malaria Ophthalmic Tonic Vitamin CThe dried stem, root bark and wood are alterative, antiperiodic, deobstruent, diaphoretic, laxative, ophthalmic and tonic (bitter)[46, 61, 158, 194, 240]. An infusion is used in the treatment of malaria, eye complaints, skin diseases, menorrhagia, diarrhoea and jaundice[240, 243]. Berberine, universally present in rhizomes of Berberis species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta E. Asia - Himalayas in Nepal. ksacta Shrubberies to 3500 metres[51]. Open hillsides at elevations of 1800 - 3000 metres[272].

propta Seed - best sown as soon as it is ripe in a cold frame, it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78]. Stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse or cold frame for at least their first winter. Once they are at least 20cm tall, plant them out into their permanent positions in late spring or early summer, after the last expected frosts. The seedlings are subject to damping off, so be careful not

dysmenorrhoea, inflammation, lumbago, snakebite and traumatic injuries[218]. The leaves are rich in rutin which is a capillary tonic, antioedemic, anti-inflammatory, antispasmodic and hypotensive[218]. Rutin also inhibits carcinogenesis and protects against radiation[218].

nrakta Eurasia. ksacta Forests and cultivated areas from Pakistan to S.W. China, 1500 - 3400 metres[51]. Found alongside ditches on shady damp and fertile soils in China[147].

propta Seed - sow spring in a greenhouse. Prick out the seedlings when they are large enough to handle and plant them out into their permanent positions in the summer. Division is very easy at almost any time in the growing season, though it is best avoided in early spring because the young growth can be damaged by late frosts. The divisions can be planted out direct into their permanent positions.

nwatta Hypothetical Crop Management: Standard Staple Crop: Balanced carbClimate: boreal to cold temperate. Humidity: arid to semi-arid. Carbon Farming Solutions - Cultivation: hypothetical - F. esculentum could be crossed with F. cymosum. Management: standard (Describes the non-destructive management systems that are used in cultivation) [1]-1].

6.2.50 Hemerocallis aurantiaca

5 tlin 9 cyuc 4 kcaak 2 tcan 1 dwat 0.8 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli flatprikwiw hpa7tmwatli dyatre7t hjonli

drutta Hemerocallis aurantiaca is an evergreen Perennial growing to 0.8 m (2ft 7in) by 0.5 m (1ft 8in). See above for USDA hardness. It is hardy to UK zone 6 and is not frost tender. It is in leaf all year, in flower from June to September. The species is hermaphrodite (has both male and female organs). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Large quantities of the leaves are said to be hallucinogenic. Blanching the leaves removes this hallucinatory component[205]. (This report does not make clear what it means by blanching, it could be excluding light from the growing shoots or immersing in boiling water[K].)

kckaak Edible Parts: Flowers Leaves RootEdible Uses: Leaves and young shoots - cooked[105, 177]. They must be consumed when very young or else they become fibrous[K]. Flowers and flower buds - raw or cooked. The tubular flowers are about 7.5cm long and 13cm in diameter[205]. Each stem carries 6 - 8 flowers[205]. The flowers contain carotene and starch[105, 177]. The flower buds contain about 43mg vitamin C per 100g, 983 IU vitamin A and 3.1% protein[205]. Root - raw or cooked. A radish-like flavour but not so sharp[205].

tcanta WeavingThe tough dried foliage is plaited into cord and used for making footwear[205].

dwatta Antidote Diuretic Vitamin CThe juice of the roots is an effective antidote in cases of arsenic poisoning[205]. A tea made from the boiled roots is used as a diuretic[205].

nrakta E. Asia - China, Japan, Korea. ksacta Thickets, grasslands and streambeds at elevations of 300 - 1000 metres in Guangdong, Guangxi, and Taiwan[266].

propta Seed - sow in the middle of spring in a greenhouse. Germination is usually fairly rapid and good. Prick out the seedlings into individual pots when they are large enough to handle. Grow the plants on for their first winter in a greenhouse and plant out in late spring[K]. Seed is only set if the plant is fertilized by another species, thus seedlings will not be true to the species type[233]. Division in spring or after flowering in late summer or autumn[200]. Division is very quick and easy, succeeding at almost any time of the year[K]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Succeeds in most soils[1], including dry ones, preferring a rich moist soil[205]. Grows well in heavy clay soils. Succeeding in sun or shade, it produces more flowers in a sunny position though these flowers can be shorter-lived in very sunny positions[205]. Succeeds in short grass if the

soil is moist[1]. Prefers a pH between 6 and 7[200]. Hybridizes freely with other members of this genus[200]. The roots have spindle-shaped swellings[205]. The cultivar 'Major' is smaller than the type species, but has larger flowers, it is sometimes cultivated for these edible flowers in Japan[205]. There is some doubt as to whether this cultivar really is a form of *H. aurantiaca*[205]. Individual flowers are very short-lived, opening in the morning and withering in the evening[205]. Plants take a year or two to become established after being moved[1]. Plants seem to be immune to the predations of rabbits[233]. The plants are very susceptible to slug and snail damage, the young growth in spring is especially at risk[200]. There is some doubt as to the origins of this plant, it might have arisen in cultivation at Kew[205]. It is cultivated in Japan, where it is believed to have come from China[58]. It is quite possibly a hybrid since it is sterile unless fertilized by another species[233].

6.2.51 Houttuynia cordata

Tsi, Chameleon, Rainbow Plant, Chameleon Plant

5 tlin 10 cyuc 4 kcaak 2 tcan 3 dwat 0.6 m hkuc pcmimhnt cyutli tcuphja7nhs6s hwicli hrasjlutnyik hpa7tli flatprikwiw hpa7tmwatli xre7t hjonli

drutta Houttuynia cordata is a PERENNIAL growing to 0.6 m (2ft) by 1 m (3ft 3in) at a fast rate. See above for USDA hardness. It is hardy to UK zone 5 and is not frost tender. It is in flower in June. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist or wet soil and can grow in water.

kckaak Edible Parts: Fruit Leaves Root ShootsEdible Uses: Teder young shoots and leaves - raw or cooked as a potherb[2, 61, 103, 183, 272]. The leaves and young shoots are harvested in the spring when about 8cm long[264]. Strongly aromatic according to one report[183] whilst others say that it is rather smelly and somewhat like rotten fish[105, 178]. Our experience is that the leaves have a delicious orange-like smell and make a marvellous flavouring in salads[K]. One report says that there are two distinct chemotypes of this species. Plants from Japan have an orange scent, whilst those from China have a smell resembling coriander leaves (*Coriandrum sativum*)[238]. Some people seem to really like this leaf, others are indifferent to it or strongly dislike it[K]. It also varies quite considerably according to the time of year. In the spring and summer it has a very acceptable flavour, but by autumn a distinct bitterness has crept in[K]. Root - cooked[177, 183]. Same comments on the smell as for the leaves[105]. Fruit[183]. No further details[K], but the fruit is a capsule that contains many small seeds[200].

tcanta A good ground cover plant[200]. Plants do not form a weed-suppressing cover[K]. A spreading plant, it should be spaced about 45cm apart each way[208].

dwatta Antibacterial Antidote Antiinflammatory Antiphlogistic Antiviral Astrigent Depurative Diuretic Dysentery Emmenagogue Febrifuge Hypoglycaemic Laxative Ophthalmic Women's complaintsThe whole plant is antibacterial, antiinflammatory, antimicrobial, antiphlogistic, antiviral, depurative, diuretic, emmenagogue, febrifuge, hypoglycaemic, laxative and ophthalmic[103, 116, 147, 174, 176, 218, 238, 240, 279]. A decoction is used internally in the treatment of many ailments including cancer, coughs, dysentery, enteritis and fever[218]. Its use is said to strengthen the immune system[176]. Externally, it is used in the treatment of snake bites and skin disorders[238]. The leaves and stems are harvested during the growing season and used fresh in decoctions[238]. The leaf juice is antidote and astrigent[218]. A root extract is diuretic[218, 240]. The root is also said to be used in medicinal preparations for certain diseases of women[240, 243]. The rhizomes yield a sterol, resembling sitosterol, which stimulates the secretion of antibiotic substances from a gram-positive spore-forming bacillus[240]. An active substance, effective in the treatment of stomach ulcers, has been extracted from the plant[240].

nrakta E. Asia - China, Japan, Himalayas. ksacta Shrubberies and damp places to 2400 metres in the Himalayas[51]. Often found as a weed in wet fields[187].

propta Seed - sow spring in a greenhouse. Prick out the seedlings into individual pots as soon as they are large

or added to soups etc[2, 27]. They can be used fresh or dried[183]. Mucilaginous[133], they are commonly used as a thickening for soups, stews and sauces[183]. The fruits are rich in pectin and are also a fair source of iron and calcium[240]. The fresh fruits contain 740 iu vitamin A[240]. The fruit should be harvested whilst young, older fruits soon become fibrous[133]. The fruit can be up to 20cm long[200]. Seed - cooked or ground into a meal and used in making bread or made into 'tofu' or 'tempeh'[183]. The roasted seed is a coffee substitute[2, 27, 133]. Probably the best of the coffee substitutes[74]. The seed contains up to 22% of an edible oil[55, 74, 177, 183, 240]. The leaves, flower buds, flowers and calyces can be eaten cooked as greens[183]. The leaves can be dried, crushed into a powder and stored for later use[183]. They are also used as a flavouring[133]. Root - it is edible but very fibrous[144]. Mucilaginous, without very much flavour[144].

tcanta Fibre Oil Paper Pectin SizeA fibre obtained from the stems is used as a substitute for jute[57, 61, 74, 169]. It is also used in making paper and textiles[171]. The fibres are about 2.4mm long[189]. When used for paper the stems are harvested in late summer or autumn after the edible seed-pods have been harvested, the leaves are removed and the stems are steamed until the fibres can be stripped off. The fibres are cooked for 2 hours with lye and then put in a ball mill for 3 hours. The paper is cream coloured[189]. A decoction of the root or of the seeds is used as a size for paper[178].

dwatta Antispasmodic Demulcent Diaphoretic Diuretic Emollient Stimulant VulneraryThe roots are very rich in mucilage, having a strongly demulcent action[4, 21]. They are said by some to be better than marsh mallow (*Althaea officinalis*)[4]. This mucilage can be used as a plasma replacement[240]. An infusion of the roots is used in the treatment of syphilis[240]. The juice of the roots is used externally in Nepal to treat cuts, wounds and boils[272]. The leaves furnish an emollient poultice[4, 21, 240]. A decoction of the immature capsules is demulcent, diuretic and emollient[240]. It is used in the treatment of catarrhal infections, aridur urinae, dysuria and gonorrhoea[240]. The seeds are antispasmodic, cordial and stimulant[240]. An infusion of the roasted seeds has sudorific properties[240].

nrakta The original habitat is obscure. ksacta Not known in a truly wild situation.

propta Seed - sow early spring in a warm greenhouse. The seed germinates in 27 days at 15°c or 6 days at 35°c[133]. When large enough to handle, prick them out into individual pots and plant them out after the last expected frosts[200].

nwatta Industrial Crop: Fiber Management: Coppice Management: Standard Regional Crop Staple Crop: Protein-oilPfers a well-drained humus rich fertile soil in full sun and a pH around 6 to 6.7[200] but it tolerates a wide range of soil types and pH from 5.5 to 8[200]. It prefers a soil with a high potash content[264]. The plant requires a warm sunny position sheltered from winds[200]. It likes plenty of moisture, both in the soil and in the atmosphere[133]. Okra is commonly cultivated in warm temperate and tropical areas for its edible seedpod, there are many named varieties[183, 200]. Most cultivars require about 4 months from sowing before a crop is produced, though some early maturing varieties can produce a crop in 50 days in the tropics[264]. This species is not very hardy in Britain, it sometimes succeeds outdoors in hot summers but is really best grown in a greenhouse since it prefers daytime temperatures of 25°c or more[260]. Plants also dislike low night temperatures[133]. There are some early-maturing varieties that are more tolerant of cooler temperate conditions and these could be tried outdoors[200]. These include 'Clemson's Spineless', 'Emerald Spineless', 'Long Green' and 'Green Velvet'[200]. The flowers are much visited by bees but they may require syringing in order to improve fertilization when plants are grown in a greenhouse. Plants resent being transplanted[133].

6.2.48 Scorzonera hispanica

Scorzonera
5 tin 9 cyuc 4 kcaak 1 tcan 0 dwat 1 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Scorzonera hispanica is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy

to UK zone 6 and is not frost tender. It is in flower from June to September, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers Leaves RootEdible Uses: CoffeeRoot - cooked[2, 27, 33, 37, 105]. A sweet agreeable flavour[1]. The root is usually eaten at the end of its first year of growth, but it can be grown on for a second year without becoming tough[200]. The root is rich in inulin[46] - this is a starch that is not easily digested by humans and so generally passes straight through the digestive system and is excreted. Inulin can cause flatulence in some people[K]. Leaves - raw[27, 33, 52]. The tender young shoots are usually eaten in early spring[183]. Flower buds - raw[57]. Added to salads[183]. The petals have their own distinctive flavour and can also be added to salads[183]. The roasted root is used as a coffee substitute[183].

tcanta RepellentThe growing plant is said to repel carrot root fly from carrots growing nearby[18].

nrakta S. Europe. ksacta Cultivated ground, rocks and bushy places[50].

propta Seed - sow spring in situ. If the weather is dry, it will be advisable to water the seed in well or germination will be delayed. The seed can also be sown in situ in August. Division in autumn or as growth commences in spring. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Succeeds in any soil in sun or light shade[200]. Prefers a light soil[37]. Occasionally cultivated for its edible root, there are some named varieties[183]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

6.2.49 Fagopyrum spp.

Perennial Buckwheat

5 tin 10 cyuc 4 kcaak 2 tcan 3 dwat 1 m hkuc
hmimhtut cyutli tcup hwicli hyihrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Fagopyrum spp. is a PERENNIAL growing to 1 m (3ft 3in) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves SeedEdible Uses: Leaves - raw or cooked[105, 160, 272]. Boiled or steamed and used like spinach[183]. Of excellent quality according to one report[2], but we have been less than impressed by the flavour, which has a distinct bitterness especially when eaten raw[K]. The leaves are rich in rutin (see below for details of its uses) and so they do make a healthy addition to the diet[K]. Seed - it can be sprouted and eaten raw, or cooked and used as a cereal[4]. Dried and ground into a powder, it can serve as a thickening agent in soups etc. The seed is rich in vitamin B6. Unfortunately, it is not freely produced in Britain[2]. Carbon Farming Solutions - Staple Crop: balanced carb (The term staple crop typically refers to a food that is eaten routinely and accounts for a dominant part of people's diets in a particular region of the world) [1-1].

tcanta Animal feed, An ornamental plant.

dwatta The whole plant is anodyne, anthelmintic, antiphlogistic, carminative, depurative and febrifuge. It stimulates blood circulation[147]. A decoction is used in the treatment of traumatic injuries, lumbago, menstrual irregularities, purulent infections, snake and insect bites[147]. A decoction of the roots is used in the treatment of insect bites,

to overwater them and keep them well ventilated[113]. Cuttings of half-ripe wood, July/August in a frame. Very difficult, if not impossible. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78]. Very difficult, if not impossible.

nwatta Prefers a warm moist loamy soil and light shade but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. Plants are very hardy, they survived the severe winters of 1986-1987 without problems in most areas of Britain[K]. Plants can be pruned back quite severely and resprout well from the base[200]. The fruits are sometimes sold in local markets in India[194]. Hybridizes freely with other members of this genus[1]. Most plants cultivated under this name are *B. chitria*, *B. coriaria*, *B. glaucocarpa*. and, more commonly, *B. floribunda*[67, 200].

6.2.41 Actinidia melanandra

Red Kiwi

5 tin 9 cyuc 4 kcaak 0 tcan 0 dwat m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Actinidia melanandra is a deciduous Climber growing to 7 m (23ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from June to July, and the seeds ripen from October to November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Bees, insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[126, 183]. The globose fruit is hairless when fully ripe and up to 45mm long[183, 198, 266]. It contains a number of small seeds, but these are easily eaten with the fruit[K].

nrakta E. Asia - W. China. ksacta Thickets around 1800 metres in W. Hupeh, Szechwan and N. Yunnan[109]. Broad-leaved forests, mountain forests and moist places at elevations of 1000 - 1600 metres[266].

propta Seed - sow spring in a greenhouse[133]. It is probably best if the seed is given 3 months stratification[113], either sow it in a cold frame as soon as it is ripe in November or as soon as it is received. Fresh seed germinates in 2 - 3 months at 10°c, stored seed can take longer[133]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for at least their first winter. When the plants are 30cm or more tall, plant them out into their permanent positions in late spring or early summer, after the last expected frosts[K]. Most seedlings are male[126]. The seedlings are subject to damping off, they must be kept well ventilated[113]. Cuttings of softwood as soon as ready in spring in a frame[K]. Cuttings of half-ripe wood, July/August in a frame. Very high percentage[13]. Cuttings of ripe wood, October/November in a frame.

nwatta Prefers a sound loamy neutral soil[1, 200]. Succeeds in semi-shade but full sun is best for fruit production[200]. Prefers a sheltered position[200]. One report says that plants are not fully hardy in the colder parts of the country[219]. Young spring growth is susceptible to frost damage[160]. Fruits are formed on second year wood and also on fruit spurs on older wood[126], any pruning is best carried out in the winter[219]. The flowers have a soft, aromatic perfume[245]. This is a climbing plant, supporting itself by twining around branches etc[200]. At least one named variety has been developed for its edible fruit[183]. Plants have been seen in fruit at Kew[11]. This species is a good pollinator for *A. arguta cordifolia*[183]. Plants in this genus are notably resistant to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required. Another report says that both sexes are on one plant[182].

6.2.42 Prunus angustifolia watsonii

Sand Plum

5 tin 9 cyuc 4 kcaak 2 tcan 1 dwat 3 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Prunus angustifolia watsonii is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: Fruit SeedEdible Uses: Fruit - raw or cooked[1, 11]. An acid taste, the fruit is often used for making preserves, pies etc[183]. A reasonable size, it is about 14mm x 9mm and contains a single large seed[200]. Seed - raw or cooked. Do not eat the seed if it is too bitter - see the notes above on toxicity.

tcanta DyeA green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168]. Wood - heavy, rather soft, not strong[82]. It weighs 43lb per cubic foot[235] and is of little commercial value[29].

dwatta Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta Central N. America. ksacta Thickets in low sandy places near streams[11].

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200]. Softwood cuttings from strongly growing plants in spring to early summer in a frame[200]. Layering in spring.

nwatta Thrives in a well-drained moisture-retentive loamy soil[11, 200]. Prefers some lime in the soil but is likely to become chlorotic if too much lime is present[1]. Succeeds in sun or partial shade though it fruits better in a sunny position[11, 200]. Unlike the type species, this sub-species thrives in Britain[11]. The flowers, which appear just before the leaves unfold, have a refreshing fruity scent[245]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. Plants in this genus are notably susceptible to honey fungus[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a running thicket former forming a colony from shoots away from the crown spreading indefinitely [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

6.2.43 Sorbus mougeotii

5 tin 9 cyuc 4 kcaak 0 tcan 0 dwat m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyfexre7t hjonli

drutta Sorbus mougeotii is a deciduous Tree growing to 18 m (59ft 1in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in May, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Apomictic (reproduce by seeds formed without sexual fusion). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

pcista The seeds probably contain hydrogen cyanide. This is the ingredient that gives almonds their characteristic flavour. Unless the seed is very bitter it should be perfectly safe in reasonable quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

ksakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[3, 105]. Eaten in early September, the fruit was not quite ripe but had already developed a pleasant slightly sweet flavour and a mealy texture, it made a very acceptable dessert fruit[K]. The fruit is about 10mm in diameter and is produced in fairly large clusters that make harvesting quite simple[K]. It is usually bletted if it is going to be eaten raw[K]. This involves storing the fruit in a cool dry place until it is almost but not quite going rotten. At this stage the fruit has a delicious taste, somewhat like a luscious tropical fruit[K]. The fruit is up to 8mm in diameter[200].

nrakta Europe. ksacta Found in the Alps, usually on carboniferous limestone[50].

propta Seed - best sown as soon as it is ripe in a cold frame[78, 80]. If you have sufficient seed it can be sown in an outdoor seedbed[78, 80]. Stored seed germinates better if given 2 weeks warm then 14 - 16 weeks cold stratification[98], so sow it as early in the year as possible. Prick out the seedlings into individual pots when they are large enough to handle. Seedlings are very slow to put on top-growth for their first year or two[11], but they are busy building up a good root system. It is best to keep them in pots in a cold frame for their first winter and then plant them out into their permanent positions in late spring.

nwatta Succeeds in most reasonably good soils in an open sunny position[11]. Tolerates light shade[188], though it fruits better in a sunny position[K]. Plants are susceptible to fireblight[188]. A tetraploid species, it is closely related to *S. intermedia* and *S. latifolia*[200]. Very similar to *S. anglica*[11]. The trees usually have apomictic flowers. They thus produce seed asexually, each seedling being a clone of the parent[11].

6.2.44 Hibiscus syriacus

Rose Of Sharon, Althaea, Shrub Althea, Hardy Hibiscus
5 tlin 9 cyuc 4 kcaak 2 tcan 2 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprklwis hpa7tmwatli xre7t hjonli

drutta Hibiscus syriacus is a deciduous Shrub growing to 3 m (9ft) by 2 m (6ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in September, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

ksakta Edible Parts: Flowers Leaves Oil RootEdible Uses: Oil TeaYoung leaves - raw or cooked[2, 177, 179, 183]. A very mild flavour, though slightly on the tough side, they make an acceptable addition to the salad bowl[K]. A tea is made from the leaves[2, 177, 240] or the flowers[183]. Flowers - raw or cooked[74, 105, 183]. A mild flavour and mucilaginous texture, they are delightful in salads, both for looking at and for eating[K]. Root - it is edible but very fibrous[144]. Mucilaginous, without very much flavour[144].

tcanta Dye Fibre Hair Hedge Hedge OilA low quality fibre is obtained from the stems. It is used for making cordage

and paper[74]. The seed contains about 25% oil[74]. No further details are given, but it is likely to be edible. A hair shampoo is made from the leaves[74]. A blue dye is obtained from the flowers[168]. This species is planted as a hedge in S. Europe[50].

dwatta Anthelmintic Antiphlogistic Antipruritic Demulcent Diuretic Dysentery Emollient Expectorant Febrifuge Ophthalmic Skin Stomachic StypticThe leaves are diuretic, expectorant and stomachic[218, 240]. A decoction of the flowers is diuretic, ophthalmic and stomachic[147, 178, 218]. It is also used in the treatment of itch and other skin diseases[240], dizziness and bloody stools accompanied by much gas[147]. The bark contains several medically active constituents, including mucilage, carotenoids, sesquiterpenes and anthocyanidins[279]. A decoction of the root bark is antiphlogistic, demulcent, emollient, febrifuge, haemostatic and vermifuge[218, 240]. It is used in the treatment of diarrhoea, dysentery, abdominal pain, leucorrhoea, dysmenorrhoea[240, 279] and dermatophytosis[147].

nrakta E. Asia - China to India. Locally naturalized in S. Europe. ksacta Found wild on mountain slopes, though the original habitat is obscure[74].

propta Seed - sow early spring in a greenhouse. Germination is usually fairly quick. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse for their first year. Plant them out into their permanent positions in late spring or early summer. Some reports say that the seed can be sown in situ outside and that it gives a good rate of germination[78, 80, 113]. Cuttings of half-ripe wood, July/August in a frame. Good percentage[113]. Cuttings of mature wood, early autumn in a frame. Good percentage[113]. Layering in mid summer to early autumn[1].

nwatta Landscape Uses:Border, Container, Foundation, Standard, Seashore, Specimen. Prefers a well-drained humus rich fertile soil in a sheltered position in full sun[200]. Succeeds in any soil of good or moderate quality[11]. Dislikes shade or badly drained soils[11]. Plants grow best with their roots in cool moist soil and their tops in a hot sunny position. This species is hardy to about -20°C[200] but plants only really succeed in the warmer counties of Britain because of their late flowering habit[184]. When planted in colder areas of the country, they will need protection for the first few winters[200]. The flowers only open in sunny weather[219]. Plants rarely require pruning[219], though they respond well to pruning and trimming and this is best carried out in the spring or just after flowering[219]. Plants are late coming into leaf, usually around the end of May or early June[182]. A very ornamental plant[1], there are many named varieties[182]. Special Features:Attracts birds, Not North American native, Naturalizing, Attracts butterflies, Blooms are very showy. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2].

6.2.45 Lycium chinense

Chinese Boxthorn, Chinese desert-thorn
5 tlin 9 cyuc 4 kcaak 3 tcan 3 dwat 2.5 m hkuc htut cyutli tcup hwicli hyishrasjlutnyik hpa7tli flatprklwis hpa7tmwatli xre7t hjonli

drutta Lycium chinense is a deciduous Shrub growing to 2.5 m (8ft) by 2 m (6ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable

pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerate maritime exposure.

pcista Some caution should be exercised with this species, particularly with regard to its edible leaves, since it belongs to a family that often contains toxins. However, use of the leaves is well documented and fairly widespread in some areas.

ksakta Edible Parts: Fruit Leaves Seed ShootsEdible Uses: Coffee TeaFruit - raw, cooked in soups etc or dried for later use[174, 178, 183]. Sweet with an aniseed-like flavour[183]. The fruit is an oblong berry about 15mm long by 8mm wid[266]. Only the fully ripe fruits should be eaten[K]. Leaves and young shoots - raw or cooked[61, 174, 178]. A peppermint-like flavour, the leaves are used in salads or used as a potherb[183]. Rich in vitamin A, the leaves also contain about 3.9% protein, 2.25% carbohydrate, 0.7% fat, 1.4% ash[179]. The roasted seed is a coffee substitute[183]. The dried leaves are a tea substitute[183].

tcanta Hedge Hedge Soil stabilizationCan be grown as an informal hedge, succeeding in maritime exposure[200]. Plants have an extensive root system and can be planted to stabilize banks[200].

dwatta Antibacterial Antipyretic Cancer Haemostatic Hepatic Hypoglycaemic Infertility Kidney Ophthalmic Tonic VasodilatorChinese boxthorn is a major Chinese tonic herb with a history of almost 2,000 years of medicinal use[254]. Both the berries and the root are used and traditionally the plant is believed to promote long life[254]. The fruit is one of the most popular tonics used in Chinese herbal medicine[176, 218]. A decoction is used to clear the vision, strengthen the kidneys, restore semen and nourish the liver[147]. The fruit protects the liver from damage caused by exposure to toxins[254]. It is also used in the treatment of diabetes mellitus, vertigo, nocturnal emissions and aching back and legs[176]. The fruit of many members of this genus is a very rich source of vitamins and minerals, especially in vitamins A, C and E, flavanoids and other bio-active compounds. It is also a fairly good source of essential fatty acids, which is fairly unusual for a fruit. It is being investigated as a food that is capable of reducing the incidence of cancer and also as a means of halting or reversing the growth of cancers[214]. The seed is used as a haemostat for the control of bleeding, with a special action on the kidneys and sex organs[218]. The root bark is antibacterial, antipyretic, hepatic, hypoglycaemic and vasodilator[176]. It stimulates the parasympathetic nervous system, which controls involuntary bodily functions such as digestive secretions[254]. The root is used in the treatment of pulmonary tuberculosis and pneumonia in small children[147], chronic febrile disease, night sweats, cough and asthma, tuberculosis, hypertension and diabetes mellitus[176]. The root can be harvested at any time of the year but traditionally it is harvested in the spring and can be dried for later use[254]. The root bark contains betaine. This can increase the rate of growth of farm animals and increase the weight and amount of eggs, it is used in the treatment of achlorhydria, atherosclerosis and hepatic diseases[176]. Haemostatic[174].

nrakta E. Asia - China, Japan. Naturalized in Britain, especially by the sea. ksacta Thickets and river banks in lowland C. and S. Japan[58].

propta Seed - sow early spring in a greenhouse. Germination is usually good and fairly quick. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse for their first winter. Plant out in late spring or early summer. Pinch out the shoot tips of the young plants in order to encourage bushy growth[78]. Cuttings of half-ripe wood, 5 - 10cm with a heel if possible, July/August in individual pots in a frame. Good percentage[78]. Cuttings of mature wood of the current season's growth, autumn to late winter in a cold frame. High percentage[78, 200]. Division of suckers in late winter. Very easy, the suckers can be planted out direct into their permanent positions. Layering.

nwatta An easily grown plant, it does not require a rich soil, flowering and fruiting better in a well-drained soil of moderate quality[1, 11, 200]. Succeeds in impoverished soils[200]. Requires a sunny position[200]. Tolerates maritime exposure[200]. A very hardy plant, tolerating temperatures down to about -23°C[200]. This species is widely cultivated for its edible young shoots in China. There is much confusion between this species and the closely related *L. bar-*

barum. Most, if not all, of the plants being grown as *L. chinense* in Britain are in fact *L. barbarum*[11, 50, 200].

6.2.46 Hydrangea serrata amagiana

5 tlin 9 cyuc 4 kcaak 2 tcan 0 dwat 2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatprklwis hpa7tmwatli xre7t hjonli

drutta Hydrangea serrata amagiana is a deciduous Shrub growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

ksakta Edible Parts: LeavesEdible Uses: SweetenerThe young leaves, even without fermentation[174], are very sweet and are used to make a sweet tea called 'tea of heaven', it is used in Buddhist ceremonies[174]!. The leaves contain phellodulcin (its chemical formula is C16 H14 O), a very sweet substance that can be used as a sugar substitute[174]. The older leaves can be dried, powdered and used as a flavouring on foods[174]. The young leaves and shoots are also eaten cooked[174].

tcanta Hedge HedgeCan be grown as a low hedge[29], it is quite wind tolerant.

nrakta E. Asia - Japan. ksacta Found only on Amagi mountain in the wild[174].

propta Seed - surface sow in a greenhouse in spring[113]. Cover the pot with paper until the seed germinates[78]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 8cm long, July/August in a frame. Overwinter in a greenhouse and plant out in late spring[78]. Cuttings of mature wood in late autumn in a frame[200]. Mound layering in spring. Takes 12 months[78]. Leaf-bud cuttings of the current seasons growth in a frame[200].

nwatta Tolerates most soil[200], thriving in a well-drained loamy soil[1], but resenting dryness at the roots[11, 200]. Succeeds in full sun or semi-shade[200], but if it is grown in a low rainfall area then it requires shade at the hottest part of the day[11]. Does well on very acid soils with a pH around 4.5[200]. The colour of the flowers reflects the pH of the soil the plant is growing in, the flowers are pink in a neutral to alkaline soil and blue in an acid soil. Best grown in an acid soil, doing well on very acid soils (pH 4.5). There is some confusion over the correct name for this plant. We have used the name in [174] but the Flora of Japan[58] says that the correct name is *H. macrophylla angustata*. Plants are hardy to about -25°C when dormant[200], but the young growth in spring can be killed by late frosts[K]. This species is notably susceptible to honey fungus[200].

6.2.47 Abelmoschus esculentus

Okra
5 tlin 11 cyuc 4 kcaak 2 tcan 3 dwat 1 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprklwisliip hpa7tmwatli xre7t hjonli

drutta Abelmoschus esculentus is a ANNUAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers moist soil.

pcista The hairs on the seed pods can be an irritant to some people and gloves should be worn when harvesting. These hairs can be easily removed by washing[200].

ksakta Edible Parts: Fruit Leaves Oil Root SeedEdible Uses: Coffee Oil PectinImmature fruit - cooked on their own

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

pcista Lovage is said to contain the alleged 'psychotroph' myristicine[218]. The volatile oil is an irritant. Contraindicated with kidney or urinary passage inflammation. Avoid during pregnancy [301].

kcakta Edible Parts: Flowers Leaves Root Seed StemEdible Uses: Condiment TeaLeaves and stems - raw or cooked[2, 4, 14, 21]. Used as a savoury flavouring in salads, soups, stews etc, imparting a yeasty/celery flavour[9, 52]. The leaves can be used fresh or dried and are available from late winter until late autumn. To ensure a good supply of the leaves in the summer, it is best to cut the plants down to the ground when flowering in the summer[K]. The young stem can be blanched and used like celery in salads or as a savoury flavouring in cooked foods[52, 183]. Seed - raw or cooked. A strong yeasty flavour, it is used as a flavouring in cakes, soups, salads etc[2, 21, 46, 200]. It can be used whole or ground into a powder. Root - cooked. A strong savoury taste, it can be used as a flavouring[142] or cooked as a vegetable[200]. It is best grated[200]. Best used when 2 - 3 years old[142]. Flowers[183]. No more details are given. A tea is made from the dried leaves. A strong savoury flavour, it tastes more like a broth[21, 183]. A tea can also be made from the grated roots[183]. An essential oil from the root is used commercially as a food flavouring[183, 238]. Yields of 0.5% are obtained[7].

tcanta EssentialAn essential oil from the plant is used in perfumery[7, 238].

dwatta Antispasmodic Aromatic Carminative Diaphoretic Digestive Diuretic Emmenagogue Expectorant Skin Stimulant Stomachic UrinaryLovage is a warming and tonic herb for the digestive and respiratory systems. It is used primarily in the treatment of indigestion, poor appetite, wind, colic and bronchitis[254]. The roots, leaves and fruits are antispasmodic, aromatic, carminative, diaphoretic, digestive, diuretic, mildly expectorant and stimulant[4, 7, 21, 46, 165, 238]. They are used internally in the treatment of disordered stomachs, especially cases of colic and flatulence in children, kidney stones, cystitis, painful menstruation and slow labour[4, 238]. Externally, the root is used in the treatment of sore throats and aphthous ulcers[238]. The roots of plants 3 years old can be harvested in early spring or in the autumn and are used fresh or dried[9, 238]. The leaves are harvested before the plant comes into flower and either distilled for their oil or dried for later use[238]. The leaves, either eaten in salads or dried and infused as a tea, have been used as an emmenagogue[4]. The essential oil from the seeds is used by aromatherapists to remove freckles and spots from the face[244]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve *Levisticum officinale* - Lovage for infections of the urinary tract, kidney and bladder stones (see [302] for critics of commission E).

nrakta Europe. Occasionally naturalized in Britain. ksacta Arable land and waste places[9] in damp soils[7, 14]. Mountain pastures and hedgerows near streams[244].

propta Seed - sow spring or early autumn in a cold frame. The seed can be slow to germinate so it is probably best sown as soon as it is ripe[K]. Prick out the seedlings into individual pots when they are large enough to handle and plant them out into their permanent positions in the summer. Division in spring or autumn. This can be quite hard work due to the size of the roots but the plant grows away very well afterwards. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Landscape Uses:Border, Container, Foundation. An easily grown plant, it prefers a rich moist but well-drained soil in a sunny position[4, 52], though it tolerates some shade[14]. Lovage has very aromatic leaves. It is often grown in the herb garden as a culinary herb[7] and is occasionally grown commercially as a food flavouring[K]. If the plant is cut back to the ground during the growing season it will produce a new flush of young leaves[200]. If the weather is dry at this time, it will be necessary to water the plants in order to encourage fresh growth[K]. Lovage is a good companion plant, improving the health and flavour of other plants

growing nearby[14, 20]. The flowers are very attractive to bees and also draw insect predators such as hoverflies into the garden[24]. Special Features: Edible, Fragrant foliage, Not North American native, Naturalizing. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

6.2.152 Echinochloa crus

Barnyard Millet, Barnyardgrass, 5 tlin 9 cyuc 3 kcaok 0 tcan 2 dwat 1.2 m hkuc htup cyutli tcup hwicli hrasljutnyik hpa7tli flatprikhwisslip hpa7tmwatli xre7t hjonli

drutta Echinochloa crus-galli is an ANNUAL growing to 1.2 m (4ft) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

pcista This grass has been reported to accumulate levels of nitrate in its tissues high enough to be toxic to farm animals[269]. This problem is most likely to occur when plants are fed with inorganic fertilizers[K].

kcakta Edible Parts: Leaves SeedEdible Uses: CoffeeSeed - cooked[35, 55, 105, 171]. Used as a millet, it can be cooked whole or be ground into a flour before use[183, 257]. It has a good flavour[85] and can be used in porridges, macaroni, dumplings etc[183]. The seed is rather small[159], though fairly easy to harvest. It has a somewhat bitter flavour[178]. Young shoots, stem tips and the heart of the culm - raw or cooked[144, 177]. A nutritional analysis is available[218]. The roasted seed is a coffee substitute[177].

tcanta Soil reclamationThe plant is sometimes used, especially in Egypt, for the reclamation of saline and alkaline areas[269].

dwatta Styptic TonicReported to be preventative and tonic, barnyard grass is a folk remedy for treating carbuncles, haemorrhages, sores, spleen trouble, cancer and wounds[269]. The shoots and/or the roots are applied as a styptic to wounds[218, 240]. The plant is a tonic, acting on the spleen[218, 240].

nrakta Native habitat is unknown but it is widespread in warmer regions occasionally introduced in Britain. ksacta Ditches roadsides and waste places in S. Europe[50]. Wet places and rich soils in India[240].

propta Seed - sow early spring in a greenhouse and only just cover the seed. When they are large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in early summer. A sowing in situ in late spring might also succeed but is unlikely to ripen a crop of seed if the summer is cool and wet.

nwatta An easily grown plant, it is adapted to nearly all types of wet places, and is often a common weed in paddy fields, roadsides, cultivated areas, and fallow fields[269]. It succeeds on a variety of wet sites such as ditches, low areas in fertile croplands and wet wastes, often growing in water[269]. It succeeds in cool regions, but is better adapted to areas where the average annual temperature is 14-16°C[269]. Tolerant of most soil types, including saline conditions, plants are not restricted by soil pH[269]. Prefers a rich moist soil[85] but succeeds in ordinary garden soil[1]. The sub-species E. crus-galli zelayensis (HBK) Hitchc. is often found growing wild in alkaline soils[236]. The plant is reported to tolerate an annual precipitation in the range of 31 to 250cm, an annual temperature range of 5.7 to 27.8°C and a pH in the range of 4.8 to 8.2[269]. Barnyard millet is sometimes cultivated for its edible seed in India[171]. It has a relatively long growing season and does not always ripen its seed in Britain, though it should do better in the eastern half of the country[K]. The plant is considered to be a very serious weed of many cultivated crops[269].

kcakta Edible Parts: LeavesEdible Uses: SweetenerThe young leaves, when dried and rubbed between the hands, become very sweet and are used to make a sweet tea called 'tea of heaven', it is used in Buddhist ceremonies[183]. The leaves contain phellodulin (its chemical formula is C16 H14 O), a very sweet substance that can be used as a sugar substitute[116, 183]. One small leaf is sufficient to sweeten a cup of tea[218]. The older leaves can be dried, powdered and used as a flavouring on foods[105, 177]. The young leaves and shoots are also eaten cooked[105, 177]. Young leaves contain the toxin hydrocyanic acid, this reduces as the leaves grow older, often to zero levels[218].

tcanta Hedge HedgeA useful hedging plant because of its vigorous growth. The Hortensias or mop-head cultivars are recommended[200].

dwatta Antiperiodic Antitussive Diuretic MalariaThe leaves, roots and flowers are antimalarial, antitussive and diuretic[218, 240]. They are said to be a more potent antimalarial than quinine, due to the presence of an alkaloid[240].

nrakta E. Asia - Japan. ksacta Sunny places near the coast of E. Japan[11].

propta Seed - surface sow in a greenhouse in spring[113]. Cover the pot with paper until the seed germinates[78]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 8cm long, July/August in a frame. Overwinter in a greenhouse and plant out in late spring[78]. Cuttings of mature wood in late autumn in a frame[200]. Mound layering in spring. Takes 12 months[78]. Leaf-bud cuttings of the current seasons growth in a frame[200].

nwatta Landscape Uses:Container, Seashore, Specimen. Tolerates most soil[200], thriving in a well-drained loamy soil[1], but resenting dryness at the roots[11, 200]. Succeeds in full sun or semi-shade[200], but if it is grown in a low rainfall area then it requires shade at the hottest part of the day[11]. Prefers a shady position[1]. Does well on very acid soils with a pH around 4.5[200]. Plants also tolerate alkaline soils, though they become chlorotic on shallow soils over chalk[200]. The colour of the flowers reflects the pH of the soil the plant is growing in, the flowers are pink in a neutral to alkaline soil and blue in an acid soil[200]. A very wind resistant plant when grown in mild areas[166]. Dormant plants are hardy to about -10°C[184], though the young growth in spring is frost-tender[K]. A very ornamental plant and polymorphic species[200], there are many named varieties[184]. This species was named for a sterile (or 'mop head') cultivar so that the true species should really be referred to as *H. macrophylla normalis*[182]. Plants are cultivated for their leaves in China and Japan. Plants are very tolerant of pruning and can be cut back into old wood if required[188]. This species is notably susceptible to honey fungus[200]. Special Features:Not North American native, All or parts of this plant are poisonous, Suitable for cut flowers, Suitable for dried flowers, Blooms are very showy.

6.2.81 Fragaria moschata

Hautbois Strawberry 5 tlin 9 cyuc 3 kcaok 2 tcan 0 dwat m hkuc hmimhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikhwisslip hpa7tmwatli xre7t hjonli

drutta *Fragaria moschata* is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from April to July, and the seeds ripen from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw. Sweet and succulent. The fruit is small but has an excellent flavour and is very aromatic[61, 142, 183, K]. It is greatly superior to the cultivated strawberries, but is not very freely produced[K].

tcanta An excellent ground cover plant, spreading vigorously by means of surface stolons and forming a dense carpet of growth[K]. It grows well amongst shrubs but is likely to suffocate smaller plants[K]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

nrakta C. Europe. Perhaps occasionally naturalized in Britain. ksacta Forests and shrubberies, and amongst tall grass[74].

propta Seed - sow early spring in a greenhouse. The seed can take 4 weeks or more to germinate. The seedlings are very small and slow-growing at first, but then grow rapidly. Prick them out into individual pots when they are large enough to handle and plant them out during the summer. Division of runners, preferably done in July/August in order to allow the plants to become established for the following years crop[200]. They can also be moved in the following spring if required, though should not then be allowed to fruit in their first year. The runners can be planted out direct into their permanent positions.

nwatta Prefers a fertile, well-drained, moisture retentive soil in a sunny position[200]. Tolerates semi-shade though fruit production will be reduced[38]. Another report says that this species prefers shade[74]. Succeeds in acid and alkaline soils[38]. Likes a mulch of pine or spruce leaves[18, 24]. At one time this species was widely cultivated for its edible fruit, but it is fairly low yielding and has now been almost totally superseded by cultivars of *F. x. ananassa*[17]. There are some named varieties[183]. The flowers are usually unisexual[200]. (This report does not say if the plants are dioecious or monoecious.) This species produces few or no stolons[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. An evergreen. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2].

6.2.82 Taxus baccata

Yew, English yew, Common Yew 5 tlin 7 cyuc 3 kcaok 4 tcan 4 dwat 15 m hkuc pcmimhtut cyutli hgatkytucm hwicli hrasljutnyikfrip hpa7tli frusflatprikhwisslip hpa7tmwatli nyanhjen hjonli

drutta *Taxus baccata* is an evergreen Tree growing to 15 m (49ft) by 10 m (32ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf all year, in flower from March to April, and the seeds ripen from September to November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). It is pollinated by Wind. The plant is not self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

pcista All parts of the plant, except the flesh of the fruit, are highly poisonous, having a paralyzing effect on the heart[1, 4, 7, 10, 19, 65]. Poisoning symptoms are dry mouth, vomiting, vertigo, abdominal pain, dyspnoea, arrhythmias, hypotension and unconsciousness.

kcakta Edible Parts: FruitEdible Uses: TeaFruit - raw[1, 2, 65, 81, 158]. Very sweet and gelatinous, most people find it delicious though some find it sickly[K]. A number of people who like the flavour do not like the texture which is often described as being 'snotty'[K]. All other parts of this plant, including the seed, are highly poisonous. When eating the fruit you should spit out the large seed found in the fruit's centre. Should you swallow the whole seed it will just pass straight through you without harm (UPDATE: this is probably not true: unfortunately, the digestive system of most mammals, including humans, is robust enough to break down

the seeds. This will release the toxic taxanes. Birds are able to eat the whole "berry" because they cannot digest the seeds). If it is bitten into, however, you will notice a very bitter flavour and the seed should immediately be spat out or it could cause some problems. The fruit is a fleshy berry about 10mm in diameter and containing a single seed[200]. Some reports suggest using the bark as a tea substitute[158, 183], this would probably be very unwise.

tcanta Fuel Hedge Hedge Insecticide WoodVery tolerant of trimming, this plant makes an excellent hedge[1, 11, 29]. The plants are often used in topiary and even when fairly old, the trees can be cut back into old wood and will re-sprout[200]. One report says that trees up to 1000 years old respond well to trimming[200]. A decoction of the leaves is used as an insecticide[46, 61]. Some cultivars can be grown as a ground cover when planted about 1 metre or more apart each way[208]. 'Repandens' has been recommended[208]. Wood - heavy, hard, durable, elastic, takes a good polish but requires long seasoning. Highly esteemed by cabinet makers, it is also used for bows, tool handles etc[4, 7, 11, 46, 61, 66, 146]. It makes a good firewood[6]. The wood is burnt as an incense[146].

dwatta Anticonvulsant Antispasmodic Cancer Cardiotonic Diaphoretic Emmenagogue Epilepsy Expectorant Homeopathy Narcotic PurgativeThe yew tree is a highly toxic plant that has occasionally been used medicinally, mainly in the treatment of chest complaints. Modern research has shown that the plants contain the substance 'taxol' in their shoots. Taxol has shown exciting potential as an anti-cancer drug, particularly in the treatment of ovarian cancers[238]. Unfortunately, the concentrations of taxol in this species are too low to be of much value commercially, though it is being used for research purposes[238]. This remedy should be used with great caution and only under the supervision of a qualified practitioner[21]. See also the notes above on toxicity. All parts of the plant, except the fleshy fruit, are antispasmodic, cardiotonic, diaphoretic, emmenagogue, expectorant, narcotic and purgative[7, 21]. The leaves have been used internally in the treatment of asthma, bronchitis, hiccup, indigestion, rheumatism and epilepsy[240, 257]. Externally, the leaves have been used in a steam bath as a treatment for rheumatism[257]. A homeopathic remedy is made from the young shoots and the berries[4]. It is used in the treatment of many diseases including cystitis, eruptions, headaches, heart and kidney problems, rheumatism etc[4]. Ingestion of 50-100g of needles can cause death.

nrakta Europe, incl Britain, from Scandinavia south and east to N. Africa, the Caucasus, Iran, Himalayas. ksacta Woods and scrub, usually on limestone. It sometimes forms pure stands in sheltered sites on chalk in the south-east and on limestone in the north-west[17].

propta Seed - can be very slow to germinate, often taking 2 or more years[78, 80]. It is best sown as soon as it is ripe in the autumn when it should germinate 18 months later. Stored seed may take 2 years or more to germinate. 4 months warm followed by 4 months cold stratification may help reduce the germination time[113]. Harvesting the seed 'green' (when fully developed but before it has dried on the plant) and then sowing it immediately has not been found to reduce the germination time because the inhibiting factors develop too early[80]. Prick out the seedlings into individual pots once they are large enough to handle and grow them on in pots in a cold frame. The seedlings are very slow-growing and will probably require at least 2 years of pot cultivation before being large enough to plant out. Any planting out is best done in late spring or early summer, after the last expected frosts[K]. Cuttings of half-ripe terminal shoots, 5 - 8cm long, July/August in a shaded frame. Should root by late September but leave them in the frame over winter and plant out in late spring[78]. High percentage[11]. Cuttings of ripe terminal shoots, taken in winter after a hard frost, in a shaded frame[113].

nwatta Industrial Crop: Medicinal Management: Coppice Regional CropLandscape Uses:Espalier, Firewood, Hedge, Screen, Standard, Superior hedge, Specimen. A very easy plant to grow, it is extremely tolerant of cold and heat, sunny and shady positions, wet and dry soils, exposure and any pH[200]. Thrives in almost any soil, acid or alkaline, as long as it is well-drained[1, 11, 200]. Grows well in heavy clay soils. Sensitive to soil compaction by roads etc[186, 200]. Very shade tolerant[17, 81]. Tolerates urban pollution[200]. In general they are very tolerant of exposure, though plants

are damaged by severe maritime exposure[K]. A very cold hardy plant when dormant, tolerating temperatures down to about -25°C[200]. The fresh young shoots in spring, however, can be damaged by frosts[186, K]. Plants are dioecious, though they sometimes change sex and monoecious trees are sometimes found[81, 186]. Male and female trees must be grown if fruit and seed is required[K]. The fruit is produced mainly on the undersides of one-year old branches[200]. A very long lived tree[1, 7, 11, 185], one report suggests that a tree in Perthshire is 1500 years old, making it the oldest plant in Britain. Another report says that trees can be up to 4000 years old[11]. It is, however, slow growing and usually takes about 20 years to reach a height of 4.5 metres[186]. Young plants occasionally grow 30cm in a year but this soon tails off and virtually no height increase is made after 100 years[185]. A very ornamental tree, there are many named varieties[200]. Very resistant to honey fungus[8, 88, 200] but susceptible to phytophthora root rot[81, 88]. The bark is very soft and branches or even the whole tree can be killed if the bark is removed by constant friction such as by children climbing the tree[186]. Plants produce very little fibrous root and should be planted in their final positions when still small[200]. The fruit is greatly relished by thrushes[186]. Special Features: Not North American native, All or parts of this plant are poisonous, Inconspicuous flowers or blooms.

6.2.83 Crataegus cuneata

Sanzashi, Chinese hawthorn
5 tlin 9 cyuc 3 kcaak 3 tcan 3 dwat 15 m hkuc
hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatprikwisslip hpa7tmwatli xre7t hjonli

drutta Crataegus cuneata is a deciduous Shrub growing to 15 m (49ft 3in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Midgees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked and used in pies, preserves etc[147, 183]. It can also be dried for later use[177, 183]. A pleasant flavour, it is sold in local markets in China and Japan[178]. The fruit contains about 0.44% protein, 1% fat, 22.1% carbohydrate, 0.8% ash, it is rich in vitamin C, fruit acids and pectin[179]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Anodyne Anticholesterolemic Astringent Blood tonic Cardiotonic Dysentery Haemostatic Hypotensive Stomachic Vitamin CThe fruits and flowers of hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222]. The fruit is anodyne, anticholesterolemic, antiarrhythmic, antidiarrhetic, astringent, blood tonic, cardiotonic, haemostatic and stomachic[61, 147, 176, 218]. It is used in the treatment of dyspepsia, stagnation of fatty food, abdominal fullness, retention of lochia, amenorrhoea, postpartum abdominal pain, hypertension and coronary heart disease[176].

nrakta E. Asia - China, Japan. ksacta Sunny places in upland wilds[147]. Valleys, thickets and hills at elevations of 200 - 2000 metres[266].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take

wounds[207, 222]. A tea made from the roots is stomachic[222]. It has been used in the treatment of stomach complaints, kidney problems, amenorrhoea, general debility, to ease childbirth and also to bathe sore eyes[222, 257].

nrakta Eastern N. America - Nova Scotia to Ontario, Alabama, Tennessee, Kansas and Colorado. ksacta Rich, often alluvial woods and thickets[43]. Woods, often along the sides of streams in Texas[274].

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

nwatta Succeeds in any deep moisture-retentive soil in sun or dappled shade[200]. Plants are hardy to about -20°C[200]. Well suited to naturalistic plantings in a woodland or wild garden[200]. A sweetly aromatic plant[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2]. The root pattern is fleshy. Thick or swollen - fibrous or tap root [1-2].

6.2.149 Amelanchier obovalis

Southern Juneberry, Coastal serviceberry
5 tlin 9 cyuc 3 kcaak 1 tcan 0 dwat 1.5 m hkuc
hmimhtut cyutli hgattcup hwicli hrasjlutnyikfrip hpa7tli flatprikwiv hpa7tmwatli fyifxre7t hjonli

drutta Amelanchier obovalis is a deciduous Tree growing to 1.5 m (5ft) by 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought.

kcakta Edible Parts: FruitEdible Uses: Fruit, raw or cooked[177]. Sweet and of very good quality, the fruit is eaten out of hand or used in pies, preserves, drinks etc[183]. The fruit is rich in iron and copper[226].

nrakta South-eastern N. America - Georgia and Alabama north to southern New Jersey[43]. ksacta Pinelands and low woods[43].

propta Seed - it is best harvested 'green', when the seed is fully formed but before the seed coat has hardened, and then sown immediately in pots outdoors or in a cold frame. If stored seed is obtained early enough in the autumn, it can be given 4 weeks warm stratification before being left out in the winter and it should then germinate in the spring. Otherwise seed can be very slow to germinate, perhaps taking 18 months or more. When large enough to handle, prick the seedlings out into individual pots and grow them on in a sheltered outdoor position, planting them out once they are 20cm or more tall. If there is sufficient seed it is best to sow it thinly in an outdoor seedbed[78, 80]. Grow the seedlings on for two years in the seedbed before planting them out into their permanent positions during the winter. Layering in spring - takes 18 months[78]. Division of suckers in late winter. The suckers need to have been growing for 2 years before you dig them up, otherwise they will not have formed roots. They can be planted out straight into their permanent positions if required.

nwatta Prefers a rich loamy soil in a sunny position or semi-shade[1, 200] but thrives in any soil that is not too dry or water-logged[11]. Grows well in heavy clay soils. Plants are stoloniferous[43]. All members of this genus have edible fruits and, whilst this is dry and uninteresting in some species, in many others it is sweet and juicy. Many of the species have potential for use in the garden as edible ornamentals. The main draw-back to this genus is that birds adore the fruit and will often completely strip a tree before it is fully ripe[K]. There is at least one named variety with improved fruits. 'Jennybelle' is a small bush, to 3.5 metres and produces few suckers so is easier to manage[183]. The

fruit is up to 12mm in diameter and is sweet even before it is fully ripe. Plants fruit heavily and start to yield when young. They are resistant to drought, frost and high temperatures[183]. Hybridizes freely with other members of this genus[200]. Grafting onto seedlings of A. lamarkii or Sorbus aucuparia is sometimes practised in order to avoid the potential problem of hybridizing[1]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2].

6.2.150 Hydrangea serrata thunbergii

Tea of heaven, Ama-tsja,
5 tlin 9 cyuc 3 kcaak 2 tcan 0 dwat 1.5 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikwiv hpa7tmwatli xre7t hjonli

drutta Hydrangea serrata thunbergii is a deciduous Shrub growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

kcakta Edible Parts: LeavesEdible Uses: SweetenerThe young leaves, after fermentation[174], become very sweet and are used to make a sweet tea called 'tea of heaven', it is used in Buddhist ceremonies[11, 46, 61]. The leaves contain phellodulin (its chemical formula is C16 H14 O), a very sweet substance that can be used as a sugar substitute[116, 183]. The older leaves can be dried, powdered and used as a flavouring on foods[105, 177]. The young leaves and shoots are also eaten cooked[105, 177].

tcanta Hedge HedgeCan be grown as a low hedge[29], it is quite wind tolerant.

nrakta E. Asia - Japan. ksacta Montane woodlands and by mountain streams all over Japan[11, 174].

propta Seed - surface sow in a greenhouse in spring[113]. Cover the pot with paper until the seed germinates[78]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 8cm long, July/August in a frame. Overwinter in a greenhouse and plant out in late spring[78]. Cuttings of mature wood in late autumn in a frame[200]. Mound layering in spring. Takes 12 months[78]. Leaf-bud cuttings of the current seasons growth in a frame[200].

nwatta Tolerates most soil[200], thriving in a well-drained loamy soil[1], but resenting dryness at the roots[11, 200]. Succeeds in full sun or semi-shade[200], but if it is grown in a low rainfall area then it requires shade at the hottest part of the day[11]. Does well on very acid soils with a pH around 4.5[200]. The colour of the flowers reflects the pH of the soil the plant is growing in, the flowers are pink in a neutral to alkaline soil and blue in an acid soil. Plants are hardy to about -25°C when dormant but the young growth in spring can be killed by late frosts. This species is notably susceptible to honey fungus[200].

6.2.151 Levisticum officinale

Lovage, Garden lovage
5 tlin 9 cyuc 3 kcaak 2 tcan 3 dwat 1.8 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikwiv hpa7tmwatli fyifxre7t hjonli

drutta Levisticum officinale is a PERENNIAL growing to 1.8 m (6ft) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in leaf from March to November, in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile.

aggressive spreading roots and, unless you have the space to let them roam, they need to be restrained by some means such as planting them in containers that are buried in the soil[K]. Hybridizes freely with other members of this genus. The flowers are very attractive to bees and butterflies[24]. A good companion plant for growing near cabbages and tomatoes, helping to keep them free of insect pests[14, 20]. Members of this genus are rarely if ever troubled by browsing deer[233].

6.2.146 Rumex patientia

Herb Patience

5 tin 10 cyuc 3 kcaak 0 tcan 1 dwat 1.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfripr hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Rumex patientia is a PERENNIAL growing to 1.5 m (5ft) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from June to July, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Plants can contain quite high levels of oxalic acid, which is what gives the leaves of many members of this genus an acid-lemon flavour. Perfectly alright in small quantities, the leaves should not be eaten in large amounts since the oxalic acid can lock-up other nutrients in the food, especially calcium, thus causing mineral deficiencies. The oxalic acid content will be reduced if the plant is cooked. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked[1, 2, 5, 37, 177]. Eaten like spinach or made into a delicious puree, they are often mixed with a quarter part of sorrel in order to add flavour to them[183]. A fairly mild flavour[183], they make an excellent vegetable[K]. The leaves are produced very early in the year[27]. Carbon Farming - The hybrid Rumex patientia x tianschanicus is a good staple crop: balanced carb.

tcanta Although no specific mention has been made for this species, dark green to brown and dark grey dyes can be obtained from the roots of many species in this genus, They do not need a mordant[168].

dwatta The juice, and an infusion of the root, has been used as a poultice and salve in the treatment of various skin problems[257]. An infusion of the root has been used in the treatment of constipation[257]. The leaves have been rubbed in the mouth to treat sore throats[257].

nrakta Europe. Naturalized in a few places in Britain[17]. ksacta Waste land in Britain[17].

propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring.

nwatta Experimental Crop Industrial Crop: Biomass Management: Coppice Management: Standard Staple Crop: Balanced carbA very easily grown plant, it succeeds in most soils, preferring a moist moderately fertile well-drained soil in a sunny position[200]. Formerly cultivated for its edible leaves[1, 2, 37, 50], these can be available in early February if the winter is mild[K]. An important food plant for the caterpillars of many species of butterfly[30].The hybrid Rumex patientia x tianschanicus (Hybrid sorrel) is a good Carbon Farming plant. Rumex patientia x tianschanicus cultivation: new crop. Management: standard, coppice. Staple Crop: balanced carb. Industrial Crop: biomass.

6.2.147 Osmorhiza occidentalis

Western Sweet-Cicely, Western sweetroot

5 tin 9 cyuc 3 kcaak 0 tcan 2 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyfixre7t hjonli

drutta Osmorhiza occidentalis is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Root SeedEdible Uses: Condiment-The root has a sweet liquorice or anise flavour and can be dried, ground into a powder and used as a flavouring for biscuits etc[85, 183, 257]. The taste is probably too strong for the whole root to be used as a vegetable[85]. The dried seeds are used as a flavouring[85, 183, 257]. The unripe seed, when still fleshy, can be nibbled raw[85, 183].

tcanta Deodorant Incense InsecticideThe roots have been used by women as a feminine deodorant[257]. They have also been placed in the clothes cupboard to impart a nice smell to clothes and have been used to rinse babies nappies[257]. A decoction of the root has been used as a dip to kill lice in chickens[257].

dwatta Antiseptic Carminative Deodorant Febrifuge Ophthalmic Oxytotic Pectoral Poultrice Skin StomachicWestern sweet-cicely was widely employed medicinally by several native North American Indian tribes who used it particularly to treat digestive disorders and as an antiseptic wash for a range of problems[257]. It is little, if at all, used in modern herbalism. An infusion of the plant is used in the treatment of coughs and colds[61, 257]. The roots are antiseptic, carminative, febrifuge, oxytotic, pectoral and stomachic[257]. An infusion has been used to induce labour in a pregnant woman and to treat fevers, indigestion, flatulence, stomach aches etc[257]. An infusion of the roots has been applied externally as a treatment for swollen breasts, sores, sore eyes etc[257]. A decoction of the root has been used as a wash on venereal sores and skin rashes[257]. A poultice of the pulped roots has been used in the treatment of cuts, sores, swellings and bruises[257]. The root has been applied to teeth to relieve the pain of toothache[257]. A hot decoction of the root has been used to kill head lice[257].

nrakta Western N. America. ksacta Shady or partly shady areas, often on slopes and in valleys[60, 85].

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

nwatta Succeeds in any deep moisture-retentive soil in sun or dappled shade[200]. Plants are hardy to about -20°C[200]. Well suited to naturalistic plantings in a woodland or wild garden[200]. A sweetly aromatic plant[200].

6.2.148 Osmorhiza longistylis

Aniseroot, Longstyle sweetroot

5 tin 9 cyuc 3 kcaak 1 tcan 1 dwat 1.2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyfixre7t hjonli

drutta Osmorhiza longistylis is a PERENNIAL growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves RootEdible Uses: Condiment TeaRoot - raw or cooked. Very sweet, aromatic and fleshy[222]. A spicy flavour similar to anise, the roots are chewed, made into a tea or used as a flavouring[105, 171, 183]. Leaves and young shoots - raw. An anise flavour, they are added to salads[177, 183]. The green seeds have an anise flavour and are used as a flavouring in salads, the dry seeds are added to cakes etc[183].

tcanta Scented.

dwatta Birthing aid Ophthalmic Poultrice StomachicA poultice of the roots are used in the treatment of boils and

another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them out in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Although perfectly cold-hardy in most of Britain when dormant, the young growth of this species might be susceptible to spring frosts[11]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

6.2.84 Pyrus balsanae

5 tin 9 cyuc 3 kcaak 0 tcan 0 dwat 15 m hkuc hmimhtut cyutli hgattcup hwicli hrasjlutnyikfripr hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Pyrus balsanae is a deciduous Tree growing to 15 m (49ft 3in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. A reasonable size, to 2.5cm[200]. The flesh is rather hard and harsh, though it becomes soft and sweet when bletted and then makes a very good dessert fruit[K].

nrakta W. Asia - Caucasus. ksacta Forests and shrub thickets[74].

propta Seed - best sown in a cold frame as soon as it is ripe in the autumn, it will then usually germinate in mid to late winter. Stored seed requires 8 - 10 weeks cold stratification at 1°C and should be sown as early in the year as possible[200]. Temperatures over 15 - 20°C induce a secondary dormancy in the seed[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for their first year. Plant them out in late spring or early summer of the following year.

nwatta Prefers a good well-drained loam in full sun[1]. Grows well in heavy clay soils. Tolerates light shade but does not fruit so well in such a position. Tolerates atmospheric pollution, excessive moisture and a range of soil types if they are moderately fertile[200]. Established plants are drought tolerant[200]. Hardy to about -15°C[200]. Plants are growing and fruiting well at Kew Botanical Gardens[K].

6.2.85 Tilia oliveri

5 tin 9 cyuc 3 kcaak 0 tcan 1 dwat 15 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Tilia oliveri is a deciduous Tree growing to 15 m (49ft) by 8 m (26ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in June, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: TeaYoung leaves - raw or cooked[179]. A very good chocolate substitute is made from a paste of the ground fruits and flowers[2]. Trials on marketing the product failed because the paste decomposes readily[2].

tcanta FibreA fibre is obtained from the tough inner bark It can be made into diverse items such as mats, shoes and coarse cloth[229].

dwatta Antispasmodic Diaphoretic SedativeA tea made from the flowers is antispasmodic, diaphoretic and sedative[226].

nrakta E. Asia - China. ksacta Moist woods in N.W. Hupreh[109]. In evergreen or mixed evergreen and deciduous forests at elevations of 1300 - 2250 metres[266].

propta Seed - much of the seed produced in Britain is not viable, cut a few seedcases open to see if there is a seed inside[80]. If possible, obtain fresh seed that is ripe but has not as yet developed a hard seed coat and sow it immediately in a cold frame. It may germinate in the following spring though it could take 18 months[80]. Stored seed can be very slow to germinate. It has a hard seed coat, embryo dormancy and a hard coat on the pericarp. All these factors mean that the seed may take up to 8 years to germinate[80]. One way of shortening this time is to stratify the seed for 5 months at high temperatures (10°C at night, up to 30°C by day) and then 5 months cold stratification[80]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Layering in spring just before the leaves unfurl. Takes 1 - 3 years[78]. Suckers, when formed, can be removed with as much root as possible during the dormant season and replanted immediately[200].

nwatta Prefers a good moist loamy alkaline to neutral soil but succeeds on slightly acid soils[11, 200]. Grows poorly on any very dry or very wet soils[200]. Dislikes exposed positions[200]. Succeeds in sun or semi-shade[188] Prefers a continental climate, growing more slowly and not producing fertile seed in areas with cool summers[200]. Lime trees tend to hybridise freely if other members of the genus are growing nearby[238]. If growing plants from seed it is important to ensure the seed came from a wild source or from an isolated clump of the single species[K]. Grows best in a woodland situation, young plants tolerate a reasonable level of side shade[200]. Closely related to T. tomentosa[1]. Trees are usually attacked by aphids which cover the ground and the leaves with a sticky honeydew[188]. Quite tolerant of root disturbance, semi-mature trees up to 5 metres tall have been transplanted successfully. Plants in this genus are notably resistant to honey fungus[200].

6.2.86 Taxus brevifolia

Pacific Yew

5 tin 9 cyuc 3 kcaak 3 tcan 4 dwat 15 m hkuc pimchmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli frusflatpriklwissip hpa7tmwatli nyanhjen hjonli

drutta Taxus brevifolia is an evergreen Tree growing to 15 m (49ft 3in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf all year, in flower from March to May, and the seeds ripen from September to November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The

plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

pcista All parts of the plant, except the flesh of the fruit, are highly poisonous[1, 4, 7, 10, 19, 65]. Another report says that the toxic alkaloid found in other yews, known as taxine, is not found in this species and that the toxicity of this species has not been conclusively proven[270]. Poisoning symptoms are dry mouth, vomiting, vertigo, abdominal pain, dyspnoea, arrhythmias, hypotension and unconsciousness.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw[105, 161, 257]. Very sweet and gelatinous, most people find it delicious though some find it sickly[K]. The fruit is a fleshy berry about 8mm in diameter and containing a single seed[200]. Trees usually produce good crops every year[229]. All other parts of this plant, including the seed, are highly poisonous. When eating the fruit you should spit out the large seed found in the fruit's centre. Should you swallow the whole seed it will just pass straight through you without harm, if the seed has been bitten into, however, it could cause some problems.

tcanta Paint WoodA red paint was made by mixing the woodchips with oil[226]. The roots have been used as the weft in twined basketry[257]. The root is very strong and is particularly good for hopper mortar baskets[257]. Wood - fine-grained, strong, hard, heavy, durable and resilient, taking a very fine polish. Though hard, the wood is easy to carve[226]. It is also used for making paddles, fence posts and various other small articles[46, 61, 82, 226, 229, 257].

dwatta Cancer Diaphoretic Pectoral PoulticeThe Pacific yew is a highly toxic plant but it was employed medicinally by several native North American Indian tribes who used it to treat a variety of complaints[257]. Modern research has shown that it contains the substance 'taxol' in its shoots and bark. Taxol has shown exciting potential as an anti-cancer drug, particularly in the treatment of ovarian cancers[238]. Unfortunately, the concentrations of taxol are rather low and the bark of 6 trees is required to provide enough taxol to treat one patient[238]. This remedy is very toxic and, even when used externally, should only be used under the supervision of a qualified practitioner[238]. See also the notes above on toxicity. All parts of the plant, except the fleshy fruit, are diaphoretic and pectoral[257]. A decoction of the branches and leaves has been used in the treatment of lung problems[257]. An infusion of the crushed leaves has been used externally as a wash to cause perspiration and effect a general improvement in the health[257]. A poultice of the crushed leaves has been applied to wounds[257]. A decoction of small woody pieces has been used in the treatment of internal complaints including stomach pain and blood in the urine[257]. The leaves are harvested in early autumn or spring, the bark from autumn to spring, for commercial extraction of taxol[238]. Ingestion of 50-100g of needles can cause death.

nrakta Western N. America - Alaska to California. ksacta Growing singly or in small clumps on the banks of mountain streams, in deep gorges and ravines, open or dense forests, especially under large coniferous trees from sea level to 2200 metres[82, 270].

propta Seed - can be very slow to germinate, often taking 2 or more years[78, 80]. It is best sown as soon as it is ripe in the autumn when it should germinate 18 months later. Stored seed may take 2 years or more to germinate. 4 months warm followed by 4 months cold stratification may help reduce the germination time[113]. Harvesting the seed 'green' (when fully developed but before it has dried on the plant) and then sowing it immediately has not been found to reduce the germination time because the inhibiting factors develop too early[80]. Prick out the seedlings into individual pots once they are large enough to handle and grow them on in pots in a cold frame. The seedlings are very slow-growing and will probably require at least 2 years of pot cultivation before being large enough to plant out. Any planting out is best done in late spring or early summer, after the last expected frosts[K]. Cuttings of half-ripe terminal shoots, 5 - 8cm long, July/August in a shaded frame. Should root by late September but leave them in the frame over winter and plant out in late spring[78]. High percentage[11]. Cuttings of ripe terminal shoots, taken in winter after a hard frost, in a shaded

frame[113].

nwatta Management: Coppice Regional CropThrives in almost any soil, acid or alkaline, as long as it is well-drained[1, 200]. Succeeds in dry soils. Plants are very shade tolerant[81]. Dormant plants are very cold-hardy, though the young growth in spring can be damaged by late frosts. A slow-growing but apparently long-lived tree[229]. Plants produce very little fibrous root and should be planted in their final positions when still small[200]. Because of its useful wood, large trees are unscrupulously poached from the wild and, in some areas, the species has been nearly extirpated. Exploitation of the species for medicinal purposes is further threatening it in the wild[270]. Plants in this genus are notably resistant to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required.

6.2.87 Rhus punjabensis sinica

5 tin 9 cyuc 3 kcaok 0 tcan 2 dwat 12 m hkuc htut cyutli tcup hwicli hrsajlutnyik hpa7tli flatpricklwis hpa7tmwatli nyanhjen hjonli

drutta Rhus punjabensis sinica is a deciduous Tree growing to 12 m (39ft 4in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in June, and the seeds ripen from August to September. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

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

koakta Edible Parts: Fruit OilEdible Uses: Drink Oil-Fruit - raw or cooked[2, 105, 145]. The fruit is small with very little flesh, but it is produced in fairly large panicles and so is easily harvested. When soaked for 10 - 30 minutes in hot or cold water it makes a very refreshing lemonade-like drink (without any fizz of course)[K]. The mixture should not be boiled since this will release tannic acids and make the drink astringent.

tcanta Dye Mordant Oil TanninAn oil is extracted from the seeds[4]. It attains a tallow-like consistency on standing and is used to make candles. These burn brilliantly, though they emit a pungent smoke[4]. The leaves are rich in tannin[145]. They can be collected as they fall in the autumn and used as a brown dye or as a mordant[169].

dwatta Antiseptic Astringent HaemostaticAn excretion produced on the leaf by an insect *Melaphis chinensis* or *M. paitan* is antiseptic, astringent and haemostatic[176]. It is used in the treatment of persistent cough with blood, chronic diarrhoea, spontaneous sweating, night sweats, bloody stool, urorrhoea and bloody sputum. It is used applied externally to burns, bleeding due to traumatic injuries, haemorrhoids and ulcers in the mouth[176].

nrakta E. Asia - Himalayas. ksacta Moist situations in valleys and ravines[146]. Thickets and forests at elevations of 460 - 3000 metres in Tibet and western China[266].

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

nwatta Succeeds in a well-drained fertile soil in full sun[11, 200]. The young growth in spring can be damaged by late frosts. This species is closely allied to *R. potaninii*[11]. This is the form of *R. punjabensis* that is most commonly

soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Regular ingestion of large quantities of these plants can be dangerous due to their high mineral content[172]. This report, which seems nonsensical, might refer to calcium oxalate. This mineral is found in *I. capensis* and so is probably also in other members of the genus. It can be harmful raw but is destroyed by thoroughly cooking or drying the plant[K]. People with a tendency to rheumatism, arthritis, gout, kidney stones and hyperacidity should take especial caution if including this plant in their diet[238].

kcakta Edible Parts: Leaves Oil Oil SeedEdible Uses: Oil OilYoung leaves and shoots - cooked[172, 183]. They should not be used on a regular basis, see warning at top of record[172]. Seed - raw[105, 177]. A delicious nutty flavour[183], but difficult to harvest in quantity mainly because of their exploding seed capsules which scatter the ripe seed at the slightest touch[K] An edible oil is obtained from the seed[17, 177, 183].

tcanta Oil OilAn oil from the seed is used for lighting[17, 177].

dwatta BachThe plant is used in Bach flower remedies - the keywords for prescribing it are 'Impatience', 'Irritability' and 'Extreme mental tension'[209]. It is also one of the five ingredients in the 'Rescue remedy'[209].

nrakta E. Asia - W. Himalayas - Pakistan to Uttar Pradesh. Naturalized in Britain. ksacta Shrubberies and bushy places, often on grazing ground, frequently gregarious, 1800 - 4000 metres in the Himalayas[51]. Grows on river banks and waste places in Britain[17].

propta Seed - sow spring in a greenhouse. A period of cold stratification may help to improve germination rates. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. If you have sufficient seed, it is worthwhile trying an outdoor sowing in situ in the spring.

nwatta Succeeds in any reasonably good soil[1]. Grows well in heavy clay soils. Prefers a moist well-drained humus rich soil in a cool site[200]. Self sows in areas where the minimum temperature is no lower than -15°C[200]. This plant has seed capsules that spring open forcibly as the seed ripens to eject the seed a considerable distance. The capsules are sensitive to touch even before the seed is ripe, making seed collection difficult but fun[K].

6.2.144 Smyrnum perfoliatum

5 tin 9 cyuc 3 kcaok 0 tcan 0 dwat 1.5 m hkuc hmimhtut cyutli tcup hwicli hrsajlutnyik hpa7tli flatpricklwis hpa7tmwatli fyjfxre7t hjonli

drutta *Smyrnum perfoliatum* is a BIENNIAL growing to 1.5 m (5ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from June to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers Leaves StemEdible Uses: CondimentLeaves and young shoots - raw in salads or cooked in soups, stews etc[2, 5, 8, 12, 27, 37, 115, 183]. The plant commences growth in the autumn and the leaves are often available throughout the winter[5, 52]. They have a rather strong celery-like flavour and are often blanched (by excluding light from the growing plant) before use[183]. Leafy seedlings can be used as a parsley substitute[183]. Stem - raw or cooked[2, 5, 8, 12, 27, 37, 53, 115]. Tasting somewhat like celery[17], it is often blanched (by excluding light) before use[183]. This species is considered to be superior to the related *S. olusatrum* because it not only blanches better but is also more crisp and tender and not so harsh flavoured[183]. Flower buds - raw[12, 52]. A celery-like flavour, they can be added to salads. The spicy seeds are used as a pepper substitute[52, 183]. Root - cooked. Boiled and used in soups, the root is said to be more tender if it has been kept in a cool place all winter[183].

nrakta S. Europe to Asia. Occasionally naturalized in Britain. ksacta Mixed oak woods[17].

propta Seed - best sown in an outdoor seedbed in autumn and planted into its permanent position in late spring[1, 200]. Germination can be slow[200]. Can also be sown in situ in spring[188].

nwatta Succeeds in most soils but prefers an open sunny position in a well-drained moisture retentive soil[1, 200]. Self-sows freely with us in our Cornwall garden, in a sunny, sheltered position[K].

6.2.145 Mentha x smithiana

Red Raripila Mint
5 tin 9 cyuc 3 kcaok 0 tcan 2 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrsajlutnyikfrip hpa7tli flatpricklwis hpa7tmwatli xre7t hjonli

drutta *Mentha x smithiana* is a PERENNIAL growing to 1 m (3ft 3in) by 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from August to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

kcakta Edible Parts: LeavesEdible Uses: Condiment TeaLeaves - raw or cooked. Used as a flavouring in salads or cooked foods. The sweetly scented leaves can be used in the same ways as spearmint[238]. A good culinary mint, the leaves have an attractive red tinge[244]. A herb tea is made from the fresh or dried leaves[238]. It has a very pleasant and refreshing taste of spearmint, leaving the mouth and digestive system feeling clean[K]. An essential oil from the leaves and flowers is used as a flavouring in sweets, ice cream, drinks etc[238].

tcanta Essential Repellent StrewingAn essential oil is obtained from the whole plant. Rats and mice intensely dislike the smell of mint. The plant was therefore used in homes as a strewing herb and has also been spread in granaries to keep the rodents off the grain[244].

dwatta Antiseptic Febrifuge StomachicRed raripila mint, like many other members of this genus, is often used as a domestic herbal remedy, being valued especially for its antiseptic properties and its beneficial effect on the digestion. Like other members of the genus, it is best not used by pregnant women because large doses can cause an abortion. A tea made from the leaves of most mint species has traditionally been used in the treatment of fevers, headaches, digestive disorders and various minor ailments[222]. The leaves are harvested as the plant comes into flower and can be dried for later use[238]. The essential oil in the leaves is antiseptic, though it is toxic in large doses[222].

nrakta Northern and Central Europe. ksacta Not known propta Seed - this hybrid is usually sterile, and even if seed is produced it will not breed true[200]. If you do obtain seed, then it can be sown in spring in a cold frame. Germination is usually fairly quick. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. Division can be easily carried out at almost any time of the year, though it is probably best done in the spring or autumn to allow the plant to establish more quickly. Virtually any part of the root is capable of growing into a new plant. Larger divisions can be planted out direct into their permanent positions. However, for maximum increase it is possible to divide the roots up into sections no more than 3cm long and pot these up in light shade in a cold frame. They will quickly become established and can be planted out in the summer.

nwatta A very easily grown plant, it succeeds in most soils and situations so long as the soil is not too dry[200]. Grows well in heavy clay soils. A sunny position is best for production of essential oils, but it also succeeds in partial shade[4]. Prefers partial shade and a slightly acid soil[4, 16]. This species is a hybrid involving *M. aquatica* x *M. arvensis* x *M. spicata*[200]. It has sweetly mint-scented leaves with similar culinary uses to *M. spicata*. Most mints have fairly

replanted immediately, preferably in a cold frame for growing on until large enough to plant out into the garden[143, 163]. The formation of bulbils on the stem can be induced by either removing the stem at flowering time and layering it just below the soil surface, or by removing all the flowers before they open.

nwatta Prefers an open free-draining humus-rich fertile loamy soil with its roots in the shade and its head in the sun[90, 200]. Prefers a sunny position[143] but also succeeds in shade[163]. Succeeds in ordinary garden soil[1]. Grows well in acid[42] and limy soils[4, 42, 47, 90], though it prefers a limey soil[200]. A very ornamental plant[1, 7]. It is seen as a symbol of purity and in Christian tradition is devoted to the Virgin Mary, in pre-Christian times it was sacred to Juno, the Goddess of heaven[238]. The flowers have a scent of heather honey[245]. The Madonna lily is generally very hardy and easy to grow[143] but it is unpredictable and does not grow or flower well in all gardens[90, 238]. It is also susceptible to botrytis[143]. Only just cover the bulb with soil[47, 200]. It is best to leave the clumps undisturbed since they resent being moved[143, 238], but if you need to transplant then this is best done in late August to early September, certainly no later than mid-October[143]. Plants produce a basal rosette of over-wintering leaves in the autumn[200], these die off as the plant comes into flower[188]. The plant should be protected against rabbits and slugs in early spring. If the shoot tip is eaten out the bulb will not grow in that year and will lose vigour[200].

6.2.141 Berberis aggregata

Salmon Barberry

5 tlin 9 cyuc 3 kcaak 1 tcan 2 dwat 1.5 m hkuc hmimhtut cyutli kyuctup hwicli hyshrasjltunykfrip hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta Berberis aggregata is a deciduous Shrub growing to 1.5 m (5ft) by 1.5 m (5ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from June to July, and the seeds ripen from September to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. A fairly acid lemony flavour, it can be eaten in quantity by those who like acid fruits - children seem particularly keen on it[K]. A very reliable cropper, the fruit is borne in abundance along the stems[1, K]. The fruit is about 7mm in diameter[200].

tcanta DyeA yellow dye is obtained from the root.

dwatta Antibacterial Cancer DysenteryBerberine, universally present in rhizomes of Berberis species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta E. Asia - W. China. ksacta Thickets and stream-sides up to 2500 metres in Kansu and W. Szechwan[67, 109].

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78]. Layering.

nwatta Prefers a warm moist loamy soil but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. Succeeds in full sun or light shade[200]. Plants can be pruned back quite severely and will resprout well from the base[200]. Hybridizes freely with other members of this genus[1]. This species is closely related to B. ludlowii, B. capillarlis and B. pariseipala[200].

soils[11, 200]. Grows well in heavy clay soils. Succeeds in full sun or light shade[11, 200]. Hybridizes freely with other members of this genus, especially the closely related B. wilsonae[1]. The true species is seldom seen in gardens, having been replaced with its hybrid progeny[182]. The seedling 'Sibbertoft Coral' is very closely related to B. aggregata and fruits well in Britain[11]. Plants can be pruned back quite severely and will resprout well from the base[200].

6.2.142 Berberis angulosa

5 tlin 9 cyuc 3 kcaak 1 tcan 2 dwat 1 m hkuc hmimhtut cyutli kyuctup hwicli hyshrasjltunykfrip hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta Berberis angulosa is a deciduous Shrub growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 105, 177]. The relatively large berries are freely borne and are more palatable than most barberries[1, 3, 11]. The fruit is about 12mm in diameter[200].

tcanta DyeA yellow dye is obtained from the root.

dwatta Antibacterial Cancer DysenteryBerberine, universally present in rhizomes of Berberis species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta E. Asia - Himalayas (Nepal) ksacta Alpine regions, open places in forests and amongst rocks in river beds to 4500 metres[51, 67].

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78]. Layering.

nwatta Prefers a warm moist loamy soil but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. Succeeds in full sun or light shade[200]. Plants can be pruned back quite severely and will resprout well from the base[200]. Hybridizes freely with other members of this genus[1]. This species is closely related to B. ludlowii, B. capillarlis and B. pariseipala[200].

6.2.143 Impatiens glandulifera

Jewelweed, Ornamental jewelweed

5 tlin 9 cyuc 3 kcaak 0 tcan 1 dwat 1.5 m hkuc hmimhtut cyutli tcup hwicli hrasjltunykfrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Impatiens glandulifera is a ANNUAL growing to 1.5 m (5ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from August to October, and the seeds ripen from September to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline)

grown in Britain[200]. Plants have brittle branches and these can be broken off in strong winds[200]. Plants are also susceptible to coral spot fungus[11]. Plants in this genus are notably resistant to honey fungus[200]. Many of the species in this genus are highly toxic and can also cause severe irritation to the skin of some people, whilst other species such as this one are not poisonous. It is relatively simple to distinguish which is which, the poisonous species have axillary panicles and smooth fruits whilst non-poisonous species have compound terminal panicles and fruits covered with acid crimson hairs[1, 4]. The toxic species are sometimes separated into their own genus, Toxicodendron, by some botanists[200]. Dioecious. Male and female plants must be grown if seed is required.

6.2.88 Rhus punjabensis

5 tlin 9 cyuc 3 kcaak 0 tcan 2 dwat 12 m hkuc htut cyutli tcup hwicli hrasjltunykfrip hpa7tli flatprikliwis hpa7tmwatli nyanhjen hjonli

drutta Rhus punjabensis is a deciduous Tree growing to 12 m (39ft 4in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in June. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

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

kcakta Edible Parts: Fruit OilEdible Uses: Drink Oil-Fruit - raw or cooked[2, 105, 145]. The fruit is small with very little flesh, but it is produced in fairly large panicles and so is easily harvested. When soaked for 10 - 30 minutes in hot or cold water it makes a very refreshing lemonade-like drink (without any fizz of course)[K]. The mixture should not be boiled since this will release tannic acids and make the drink astringent.

tcanta Dye Mordant OilAn oil is extracted from the seeds[4]. It attains a tallow-like consistency on standing and is used to make candles. These burn brilliantly, though they emit a pungent smoke[4]. The leaves are rich in tannin[145]. They can be collected as they fall in the autumn and used as a brown dye or as a mordant[169].

dwatta Antiseptic Astringent HaemostaticAn excretion produced on the leaf by an insect Melaphis chinensis or M. paitan is antiseptic, astringent and haemostatic[176]. It is used in the treatment of persistent cough with blood, chronic diarrhoea, spontaneous sweating, night sweats, bloody stool, urorrhoea and bloody sputum. It is used applied externally to burns, bleeding due to traumatic injuries, haemorrhoids and ulcers in the mouth[176].

nrakta E. Asia - C. and W. China. ksacta Thickets and woodland margins in W. China[109].

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

nwatta Succeeds in a well-drained fertile soil in full sun[11, 200]. The young growth in spring can be damaged by late frosts. Plants have brittle branches and these can be broken off in strong winds[200]. Plants are also susceptible to coral spot fungus[11]. Plants in this genus are notably resistant to honey fungus[200]. This species is closely related to R. potaninii[11]. R. punjabensis sinica is the form of

this plant that is most usually grown in Britain[200]. Many of the species in this genus are highly toxic and can also cause severe irritation to the skin of some people, whilst other species are not poisonous. It is relatively simple to distinguish which is which, the poisonous species have axillary panicles and smooth fruits whilst non-poisonous species have compound terminal panicles and fruits covered with acid crimson hairs[1, 4]. The toxic species are sometimes separated into their own genus, Toxicodendron, by some botanists[200]. Dioecious. Male and female plants must be grown if seed is required.

6.2.89 Malus fusca

Oregon Crab, Oregon crab apple

5 tlin 9 cyuc 3 kcaak 0 tcan 2 dwat 12 m hkuc hmimhtut cyutli tcup hwicli hrasjltunykfrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Malus fusca is a deciduous Tree growing to 12 m (39ft 4in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

kcakta Edible Parts: FruitEdible Uses: Pectin Pectin-Fruit - raw or cooked[11, 101]. Up to 2cm in diameter[229]. An agreeable sub-acid taste, it can be eaten out of hand or made into jellies, preserves etc[183]. The fruit can be left on the tree until there have been some autumn frosts, this will soften the fruit and make it somewhat less acid[K]. The fruit is rich in pectin so it can be added to pectin-low fruits when making jams or jellies[183, 257]. Pectin is also said to protect the body against radiation[201].

tcanta Pectin Pectin WoodThe fruit is a source of pectin[183]. Wood - hard, close grained, durable. Used for mallets, tool handles and bearings[11, 82, 99, 101, 226].

dwatta Antirheumatic Astringent Diuretic Dysentery Eczema Laxative Ophthalmic Pectoral Skin Stomachic TB TonicOregon crab was employed medicinally by several native North American Indian tribes who used it to treat a variety of complaints[257]. In particular, it gained a reputation with some tribes as a heal-all, especially useful for treating any of the internal organs[257]. It is little, if at all, used in modern herbalism. The trunk, bark and inner bark are antirheumatic, astringent, blood purifier, cardiac, diuretic, laxative and tonic[257]. A decoction has been used in the treatment of coughs, stomach ulcers, dysentery, diarrhoea, rheumatism and consumption[257]. The shredded bark has been used to treat blood spitting[257]. A poultice of the chewed bark has been applied to wounds[257]. An infusion of the bark is used as an eyewash[257]. A decoction of the bark is used as a wash on cuts, eczema and other skin problems[257]. An infusion of the bark, combined with wild cherry bark (Prunus sp.) has been used as a cure-all tonic[257]. The juice scraped from the peeled trunk has been used as an eye medicine[257]. The soaked leaves have been chewed in the treatment of lung problems[257].

nrakta Western N. America - Alaska to California. ksacta Moist woods, stream banks, swamps and bogs in deep rich soils[60, 82], usually occurring in dense pure thickets[229].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. It usually germinates in late winter. Stored seed requires stratification for 3 months at 1°C and should be sown in a cold frame as soon as it is received[200]. It might not germinate for 12 months or more. Prick out

the seedlings into individual pots as soon as they are large enough to handle. If given a rich compost they usually grow away quickly and can be large enough to plant out in late summer, though consider giving them some protection from the cold in their first winter. Otherwise, keep them in pots in a cold frame and plant them out in late spring of the following year. Cuttings of mature wood, November in a frame[11].

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade, though it fruits less well in such a situation[200]. A very ornamental plant[1], it is slow-growing in the wild[229]. Hybridizes freely with other members of this genus[200]. The fruit is a good wildlife food source, especially for birds[200]. Plants in this genus are notably susceptible to honey fungus[200].

6.2.90 Arundinaria gigantea

Canebrake bamboo, Cane Reed, Giant cane
5 tlin 9 cyuc 3 kcaak 4 tcan 1 dwat 9 m hkuc
hmmihmtt cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Arundinaria gigantea is an evergreen Bamboo growing to 9 m (29ft 6in). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Seed Shoots StemEdible Uses: Young shoots - cooked[11, 22, 46, 105, 183]. Used as a pot-herb[236]. Seed - cooked[46, 61, 161]. It can be used as a wheat substitute[2, 105], for which it is not much inferior[213], but it is rather small and difficult to collect in quantity[159]. The plants only flower at irregular intervals of several years.

tcanta Basketry Fodder Hedge Musical Soil stabilization WeavingAgroforestry Uses: With its extensive running root system, the plant is ideal for helping to control soil erosion, especially along the sides of rivers[352]. The extensive growth of the plant provides streambank stabilization, sediment retention, and bioaccumulation of nutrients and toxins[1050].So long as it can be restrained, the plant makes an excellent, dense hedge or screen[352]. The canes are used as pipe-stems, are woven into baskets and mats plus a variety of other purposes[169, 236]. The hollow stems can be made into flutes[257]. Carbon Farming Solutions - Industrial Crop: biomass (Crops grown for non-food uses. Industrial crops provide resources in three main categories: materials, chemicals, and energy. Traditional materials include lumber and thatch, paper and cardboard, and textiles) [1-1]. Fodder: bank.

dwatta CatharticThe root is cathartic. A decoction has been used to stimulate the kidneys and 'renew strength'[257].

nrakta Southeastern N. America - Ohio, Indiana, Illinois and Oklahoma to North Carolina, Florida and Texas. ksacta Forms dense thickets along riverbanks, in swamps and low woods[43, 235]. Found on all types of soil from sea level to 600 metres[195].

propta Seed - surface sow as soon as it is ripe in a greenhouse at about 20°c. Do not allow the compost to dry out. Germination usually takes place fairly quickly so long as the seed is of good quality, though it can take 3 - 6 months. When large enough to handle, prick the seedlings out into individual pots and grow them on in a lightly shaded place in the greenhouse until large enough to plant out. Bamboos only flower at intervals of several years and so seed is rarely available. Division in late spring as new growth commences. Take divisions with at least three canes in the clump, trying to cause as little root disturbance to the main plant as possible. Grow them on in light shade in a greenhouse in pots of a high fertility sandy medium. Mist the foliage regularly until plants are established. Plant them out into their permanent positions when a good root system has developed, which can take a year or more[200]. Rhizome cuttings. Basal cane cuttings.

nwatta Fodder: Bank Management: Managed Multistem Wild CropPrefers an open loam of fair quality and a position sheltered from cold drying winds[1, 11, 25]. Succeeds on peaty soils. Requires abundant moisture and plenty of organic matter in the soil. Plants are intolerant of drought[1]. Succeeds in full sun or dappled shade in warm, humid, damp conditions[200]. Some reports say that this plant is only hardy in S.W.England[1, 11, 25] though another report says that the roots are hardy to about -30°c if they are heavily mulched[169]. This plant used to form very extensive stands in much of south-eastern N. America, but it provides a nutritious forage and is very easily destroyed by the continuous grazing of cattle or the rooting of pigs and so has been greatly reduced in the wild[236]. This species is notably resistant to honey fungus[200]. Plants only flower at intervals of many years. When they do come into flower most of the plants energies are directed into producing seed and consequently the plant is severely weakened. They sometimes die after flowering, but if left alone they will usually recover though they will look very poorly for a few years. If fed with artificial NPK fertilizers at this time the plants are more likely to die[122]. The rootstock is running, forming new shoots from late May[25]. Carbon Farming Solutions - Managed bamboo forest sequester more carbon than wild bamboo and the same as fast-growing tropical trees like eucalyptus. Cultivation: minor global crop. Management: managed multistem (Describes the non-destructive management systems that are used in cultivation) [1-1]. The plant is heat tolerant in zones 9 through 5. (Plant Hardness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. An evergreen. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

6.2.91 Amelanchier interior

Pacific serviceberry
5 tlin 9 cyuc 3 kcaak 0 tcan 0 dwat 9 m hkuc
hmmihmtt cyutli tcup hwicli hrasjlutnyikfrp hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta Amelanchier interior is a deciduous Tree growing to 9 m (29ft 6in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. A sweet taste[177, K] and a juicy texture[229, K], even before the fruit is fully ripe[K]. The fruit is produced in small clusters and is up to 8mm in diameter[229]. The fruit is rich in iron and copper[226]. This species has been seen fruiting well at Kew where the fruit ripened about 3 weeks later than most of the other species[K].

nrakta Central N. America - Wisconsin and S. Minnesota and south to S. Dakota ksacta Hillsides and banks of streams[43].

propta Seed - it is best harvested 'green', when the seed is fully formed but before the seed coat has hardened, and then sown immediately in pots outdoors or in a cold frame. If stored seed is obtained early enough in the autumn, it can be given 4 weeks warm stratification before being left out in the winter and it should then germinate in the spring. Otherwise seed can be very slow to germinate, perhaps taking 18 months or more. When large enough to handle, prick the seedlings out into individual pots and grow them on in a sheltered outdoor position, planting them out once they are 20cm

grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Regular ingestion of large quantities of these plants can be dangerous due to their high mineral content[172]. This report, which seems nonsensical, might refer to calcium oxalate. This mineral is found in *I. capensis* and so is probably also in other members of the genus. It can be harmful raw but is destroyed by thoroughly cooking or drying the plant[K]. People with a tendency to rheumatism, arthritis, gout, kidney stones and hyperacidity should take especial caution if including this plant in their diet[238].

kcakta Edible Parts: Leaves SeedEdible Uses: Young shoots - cooked[105, 172]. See the notes above on toxicity. Seed - raw. A delicious nutty flavour but rather difficult to harvest[172], mainly because of their exploding seed capsules which scatter the ripe seed at the slightest touch[K].

dwatta Antiseptic Diuretic Emetic LaxativeThe plant is antiseptic, diuretic, strongly emetic, laxative and vulnerary[4, 9, 61]. It has been used in the treatment of stranguary and haemorrhoids[4]. The plant is occasionally used internally in the treatment of haemorrhoids and as a laxative and diuretic, but the dose must be carefully adhered to since large quantities are strongly emetic[9]. The plant is harvested at any time in the summer[9].

nrakta Europe, including Britain, from Scandanavia to France, east to Macedonia and temperate Asia. ksacta By streams, wet ground in woods in N. Wales, the Lake District, Yorkshire and Lancashire[17].

propta Seed - sow spring in a greenhouse. A period of cold stratification may help to improve germination rates. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. If you have sufficient seed, it is worthwhile trying an outdoor sowing in situ in the spring or the autumn[4].

nwatta Succeeds in any reasonably good soil[1]. Grows well in heavy clay soils. Prefers a moist well-drained humus rich soil in a cool site[200]. Self sows in areas where the minimum temperature is no lower than -15°c[200]. This plant has seed capsules that spring open forcibly as the seed ripens to eject the seed a considerable distance. The capsules are sensitive to touch even before the seed is ripe, making seed collection difficult but fun[K].

6.2.139 Smyrniium olusatrum

Alexanders
5 tlin 9 cyuc 3 kcaak 2 tcan 1 dwat 1.2 m hkuc
hmmihmtt cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta Smyrniium olusatrum is a BIENNIAL growing to 1.2 m (4ft) by 0.7 m (2ft 4in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from May to June, and the seeds ripen from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by insects. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Flowers Leaves Root StemEdible Uses: CondimentLeaves and young shoots - raw in salads or cooked in soups, stews etc[2, 5, 8, 12, 27, 37, 115, 183]. The plant comes into growth in the autumn and the leaves are often available throughout the winter[5, 52]. They have a rather strong celery-like flavour and are often blanched (by excluding light from the growing plant) before use[183]. Leafy seedlings can be used as a parsley substitute[183]. Stem - raw or cooked[2, 5, 8, 12, 27, 37, 53, 115]. It tastes somewhat like celery, but is more pungent[17, 244]. The stem is often blanched (by excluding light from the growing plant) before use[183]. Flower buds - raw[12, 52]. Added to salads, they have a celery-like flavour[K]. The spicy seeds are used as a pepper substitute[52, 183]. Root - cooked. Boiled and used in soups, its flavour is somewhat like celery. The root is said to be more tender if it has been kept in a cool place all winter[183].

tcanta A good wildlife plant. Scented. A good plant for food forests/forest gardens.

dwatta Bitter DigestiveThe whole plant is bitter and digestive. It has been used in the past in the treatment of asthma, menstrual problems and wounds, but is generally considered to be obsolete as a medicinal plant[238].

nrakta Europe to Asia. Naturalized in Britain[17]. ksacta Hedges and waste places, often near the sea[17].

propta Seed - best sown in an outdoor seedbed in autumn and planted into its permanent position in late spring[1, 200]. Germination can be slow[200]. The seed can also be sown in situ in spring.

nwatta Succeeds in most soils but prefers an open sunny position in a well-drained moisture retentive soil[200]. Hardy to about -15°c[200]. At one time this plant was extensively grown for its edible leaves and stems but it has now fallen into virtual disuse, having been replaced by celery[1, 2, 27, 37, 61, 183]. The seeds are highly aromatic with a myrrh-like scent[245]. A good bee plant. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fleshy. Thick or swollen - fibrous or tap root [2-1].

6.2.140 Lilium candidum

Madonna Lily
5 tlin 9 cyuc 3 kcaak 0 tcan 2 dwat 1 m hkuc
hmmihmtt cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Lilium candidum is a BULB growing to 1 m (3ft 3in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf from October to July, in flower in July, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Bulb - cooked. The raw bulb contains an acrid principle, but this is destroyed by drying or thorough heating[4]. When cooked the bulb is pulpy, sweet and sugary[4]. Rich in starch, it can be used as a vegetable in similar ways to potatoes (*Solanum tuberosum*).

tcanta EssentialAn essential oil from the flowers is used in perfumery[4, 61].

dwatta Astringent Demulcent Emmenagogue Emollient Epilepsy ExpectorantThe Madonna lily has a long history of herbal use, though it is seldom employed in modern herbalism because of its scarcity[238]. The bulb and the flowers are astringent, highly demulcent, emmenagogue, emollient and expectorant[4, 7, 238]. The plant is mainly used externally, being applied as a poultice to tumours, ulcers, external inflammations etc[4, 238]. The bulb is harvested in August and can be used fresh or dried[4, 238]. The flowers are harvested when fully open and used fresh for making juice, ointments or tinctures[238]. The pollen has been used in the treatment of epilepsy[240].

nrakta S.W. Asia. Naturalized in Europe around the Mediterranean. ksacta Rocky slopes and in scrub to 600 metres[50, 90].

propta Seed - immediate epigeal germination[130]. Sow thinly in pots from late winter to early spring in a cold frame. Should germinate in 2 - 4 weeks[163]. Great care should be taken in pricking out the young seedlings, many people prefer to leave them in the seed pot until they die down at the end of their second years growth. This necessitates sowing the seed thinly and using a reasonably fertile sowing medium. The plants will also require regular feeding when in growth. Divide the young bulbs when they are dormant, putting 2 - 3 in each pot, and grow them on for at least another year before planting them out into their permanent positions when the plants are dormant[K]. Division with care in the autumn once the leaves have died down. Replant immediately[200]. Bulb scales can be removed from the bulbs in early autumn. If they are kept in a warm dark place in a bag of moist peat, they will produce bulblets. These bulblets can be potted up and grown on in the greenhouse until they are large enough to plant out[200]. Bulblets are formed on the stem just below the soil surface. These should be dug up in the autumn and

greens F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2].

6.2.136 Lycium ruthenicum

5 tlin 9 cyuc 3 kcak 3 tcan 2 dwat 2 m hkuc htut cyutli hgqtiyuctcup hwicli hyishrasjlutnyk hpa7tli flat-prikliwshom hpa7tmwatli xre7t hjonli

drutta Lycium ruthenicum is a deciduous Shrub growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 6. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in saline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

pista Although no records of toxicity have been seen for this species, it does belong to a family that contains many poisonous plants. Some caution should be applied, especially towards leaves or unripe fruits, though ripe fruits are almost certainly edible.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[146, 177]. Only the fully ripe fruits should be eaten[K].

tcanta Soil stabilizationPlants are very drought tolerant and have an extensive root system. They can be planted to stabilize banks and sandy soils[200, 266].

dwatta Cancer OphthalmicThe plant is used as an ointment to treat blindness in camels[240]. The fruit of many members of this genus is a very rich source of vitamins and minerals, especially in vitamins A, C and E, flavanoids and other bio-active compounds. It is also a fairly good source of essential fatty acids, which is fairly unusual for a fruit. It is being investigated as a food that is capable of reducing the incidence of cancer and also as a means of halting or reversing the growth of cancers[214].

nrakta E. Asia - Himalayas. ksacta Higher inner Malayas, 1800 - 3900 metres[146]. Saline deserts and sands, roadsides at elevations of 400 - 3,000 metres in western China[266].

propta Seed - sow early spring in a greenhouse. Germination is usually good and fairly quick. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse for their first winter. Plant out in late spring or early summer. Pinch out the shoot tips of the young plants in order to encourage bushy growth[78]. Cuttings of half-ripe wood, 5 - 10cm with a heel if possible, July/August in individual pots in a frame. Good percentage[78]. Cuttings of mature wood of the current season's growth, autumn to late winter in a cold frame. High percentage[78, 200]. Division of suckers in late winter. Very easy, the suckers can be planted out direct into their permanent positions. Layering.

nwatta Does not require a rich soil, flowering and fruiting better in a well-drained soil of moderate quality[11]. Succeeds in impoverished and saline soils[200, 266]. Requires a sunny position[200]. Tolerates maritime exposure[200] and drought[266].

6.2.137 Mahonia bealei

Beale's barberry, Leatherleaf Mahonia
5 tlin 8 cyuc 3 kcak 0 tcan 2 dwat 2 m hkuc pcmhmmhtut cyutli tcup hwicli hrasjlutnykfrip hpa7tli flat-prikliwis hpa7tmwatli xre7t hjonli

drutta Mahonia bealei is an evergreen Shrub growing to 2 m (6ft) by 2 m (6ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf all year, in flower from January to March, and the seeds ripen from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects.

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

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. A pleasant acid flavour, it is nice when added to muesli or porridge[K]. Unfortunately, there is relatively little flesh and a lot of seeds[K]. The fruit is about 10mm long and 6mm wide[200], it ripens in April/May and if the plant is in a sheltered position the crops can be fairly heavy[K].

dwatta Antibacterial Antiphlogistic Antirheumatic Cancer Depurative Dysentery Febrifrage TonicThe leaf is febrifuge and tonic[218]. A decoction of the root and stems is antiphlogistic, antirheumatic, depurative and febrifuge[147, 218]. A decoction is used in the treatment of pulmonary tuberculosis, recurring fever and cough in rundown body systems, rheumatoid arthritis, backache, weak knees, dysentery and enteritis[147]. The root and root bark are best harvested in the autumn[213]. Berberine, universally present in rhizomes of Mahonia species, has marked antibacterial effects[218] and is used as a bitter tonic[213]. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta E. Asia - W. China in Hupeh, Hubei, Sichuan and Taiwan. ksacta Damp woodlands in uplands around 2000 metres[184].

propta Seed - best sown as soon as it is ripe in a cold frame[78]. It usually germinates in the spring[K]. 'Green' seed (harvested when the embryo has fully developed but before the seed case has dried) should be sown as soon as it is harvested and germinates within 6 weeks[K]. Stored seed should be sown as soon as possible in late winter or spring. 3 weeks cold stratification will improve its germination, which should take place in 3 - 6 months at 10°C. Prick out the seedlings when they are large enough to handle and grow them on in a cold frame for at least their first winter. Plant them out in late spring or early summer. Division of suckers in spring[78]. Whilst they can be placed direct into their permanent positions, better results are achieved if they are potted up and placed in a frame until established[11]. Leaf cuttings in the autumn.

nwatta Landscape Uses:Border, Foundation, Pest tolerant, Massing, Rock garden, Specimen, Woodland garden. Thrives in any good garden soil[11]. Grows well in heavy clay soils. Survives under quite heavy tree cover[11], thriving in dense shade[182]. Prefers a semi-shaded woodland position in a damp, slightly acid to neutral humus-rich soil[200]. The fully dormant plant is hardy to about -20°C[184], though the young growth in spring can be damaged by late frosts. Scarcely distinct from *M. japonica*[11, 200], differing mainly in its broader leaflets which are placed closer together on the stem and its erect flower racemes[245]. It is often treated as a subspecies of *M. japonica*, despite the fact that this species is found in the wild whilst *M. japonica* is a cultigen and not a wild plant[11, 200]. Plants of the two species are often confused in cultivation. The flowers are sweetly scented[245]. Hybridizes freely with other members of this genus. Special Features:Attractive foliage, Not North American native, Extended bloom season in Zones 9A and above, Fragrant flowers, Attractive flowers or blooms.

6.2.138 Impatiens noli

Touch-Me-Not

5 tlin 9 cyuc 3 kcak 0 tcan 2 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnykfrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Impatiens noli-tangere is a ANNUAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can

or more tall. If there is sufficient seed it is best to sow it thinly in an outdoor seedbed[78, 80]. Grow the seedlings on for two years in the seedbed before planting them out into their permanent positions during the winter. Layering in spring - takes 18 months[78]. Division of suckers in late winter. The suckers need to have been growing for 2 years before you dig them up, otherwise they will not have formed roots. They can be planted out straight into their permanent positions if required.

nwatta We have very little information on this species. We do not know if it will be hardy in Britain, though it is growing and fruiting well at Kew Gardens in London[K] and judging by its native range it should succeed outdoors in most parts of the country. This species is not stoloniferous[43]. The following notes are based on the general needs of this genus. Prefers a rich loamy soil in a sunny position or semi-shade[1, 200] but thrives in any soil that is not too dry or water-logged[11]. Grows well in heavy clay soils. All members of this genus have edible fruits and, whilst this is dry and uninteresting in some species, in many others it is sweet and juicy. Many of the species have potential for use in the garden as edible ornamentals. The main draw-back to this genus is that birds adore the fruit and will often completely strip a tree before it is fully ripe[K]. Hybridizes freely with other members of this genus[200]. Grafting onto seedlings of *A. lamarckii* or *Sorbus aucuparia* is sometimes practised in order to avoid the potential problem of hybridizing[1].

6.2.92 Fraxinus ornus

Manna Ash, Flowering ash

5 tlin 6 cyuc 3 kcak 0 tcan 3 dwat 9 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyk hpa7tli flatprikliwis hpa7tmwatli nyanhjen hjonli

drutta Fraxinus ornus is a deciduous Tree growing to 9 m (29ft) by 6 m (19ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in May, and the seeds ripen from September to December. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

pista Contact with the sap has caused skin or systemic allergic reactions in some people[238].

kcakta Edible Parts: MannaEdible Uses: Manna - a sweetish exudate is obtained from the stems by incision[2, 4, 11, 114, 171, 183]. The quality is better from the upper stems. A mild sweet taste[114], its main use is as a mild and gentle laxative[171], though it is also used as a sweetener in sugar-free preparations and as an anti-caking agent[238]. The tree trunk must be at least 8cm in diameter before the manna can be harvested[4]. A vertical series of oblique incisions are made in the trunk in the summer once the tree is no longer producing many new leaves[4]. One cut is made every day from July to the end of September. A whitish glutinous liquid exudes from this cut, hardens and is then harvested[2]. Dry and warm weather is essential if a good harvest is to be realised[4]. The tree is harvested for 9 consecutive years, which exhausts the tree. This is then cut down, leaving one shoot to grow back. It takes 4 - 5 years for this shoot to become productive[2]. Average yields of 6 kilos per hectare of top quality manna, plus 80 kilos of assorted manna are achieved[2].

dwatta Laxative TonicThe manna obtained from the trunk is a gentle laxative and a tonic[4, 46]. It is especially valuable for children and pregnant women[4, 238]. Its action is normally very mild, though it does sometimes cause flatulence and pain[4].

nrakta S. Europe to W. Asia. ksacta Mixed woodland, thickets and rocky places[50], mainly on limestone[89].

propta The seed is best harvested green - as soon as it is fully developed but before it has fully dried on the tree - and can then be sown immediately in a cold frame[80]. It usually germinates in the spring[80]. Stored seed requires a period of cold stratification and is best sown as soon as possible in a cold frame[200]. Prick out the seedlings into

individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant them out into their permanent positions or a nursery bed in late spring or early summer of the following year. If you have sufficient seed then it is possible to sow it directly into an outdoor seedbed, preferably in the autumn. Grow the seedlings on in the seedbed for 2 years before transplanting either to their permanent positions or to nursery beds.

nwatta Landscape Uses:Pollard, Specimen. Prefers a deep loamy soil, even if it is on the heavy side[1, 200]. Most members of this genus are gross feeders and require a rich soil[11, 200]. Succeeds in exposed positions[200] and in alkaline soils[11]. Requires a moist soil according to some reports[1, 11] whilst another says that it succeeds in drier soils[200]. Plants are tolerant of atmospheric pollution[200]. Although the dormant plant is very cold-hardy, the young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. A very ornamental plant[1], the manna ash is cultivated for its edible manna in Sicily and Calabria[89, 142]. The flowers are sweetly scented[245]. Trees have a very dense canopy[111]. Dioecious. Male and female plants must be grown if seed is required. Special Features:Not North American native, Attractive flowers or blooms.

6.2.93 Prunus hortulana

Hog Plum, Hortulan plum

5 tlin 9 cyuc 3 kcak 2 tcan 1 dwat 9 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyk hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Prunus hortulana is a deciduous Tree growing to 9 m (29ft 6in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from April to May, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: Flowers Fruit SeedEdible Uses: Fruit - raw or cooked. Thin-skinned[227] with an agreeable flavour, it can be eaten out of hand or be made into pies, preserves etc[183]. Another report says that it is small and not very palatable, and is only used in preserves[171]. The fruit is about 12mm in diameter and contains one large seed[200]. The fruit is up to 25mm long according to other reports[227, 229]. Flower buds[46]. No more details are given. Seed - raw or cooked. Do not eat the seed if it is too bitter - see the notes above on toxicity.

tcanta Dye WoodA green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168]. Wood - heavy, hard, strong. Used for turnery[46].

dwatta Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta Southern and Central N. America - Indiana to Iowa, Missouri, Kansas and Texas. ksacta Bottomlands, thickets and woodland edges[43], in rich moist soils[82].

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be

rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200]. Softwood cuttings from strongly growing plants in spring to early summer in a frame[200]. Layering in spring.

nwatta Thrives in a well-drained moisture-retentive loamy soil[11, 200]. Prefers some lime in the soil but is likely to become chlorotic if too much lime is present[1]. Succeeds in sun or partial shade though it fruits better in a sunny position[11, 200]. Sometimes cultivated for its edible fruit in Southern N. America, there are some named varieties[43, 183]. This tree is of very little value for its fruit in Britain, requiring hotter summers than are usually experienced here if it is to fruit well[1]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. Plants in this genus are notably susceptible to honey fungus[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A sprouting standard sending up shoots from the base [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2].

6.2.94 Actinidia coriacea

5 tlin 9 cyuc 3 kcaak 0 tcan 0 dwat 8 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli nyanhjen hjonli

drutta Actinidia coriacea is an evergreen Climber growing to 8 m (26ft 3in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf all year, in flower from May to June. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Bees, insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[3, 183]. Small but very juicy and full of seeds[182]. The fruit is up to 2cm long[198]. It contains a number of small seeds, but these are easily eaten with the fruit[K].

nrakta E. Asia - W. China in Sichuan and Baxiong provinces. ksacta Hedges and woods[126]. Thickets, 200 - 1000 metres from Kweichow and Szechuan to N.W. Yunnan[198].

propta Seed - sow spring in a greenhouse[133]. It is probably best if the seed is given 3 months stratification[113], either sow it in a cold frame as soon as it is ripe in November or as soon as it is received. Fresh seed germinates in 2 - 3 months at 10°C, stored seed can take longer[133]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for at least their first winter. When the plants are 30cm or more tall, plant them out into their permanent positions in late spring or early summer, after the last expected frosts[K]. Most seedlings are male[126]. The seedlings are subject to damping off, they must be kept well ventilated[113]. Cuttings of softwood as soon as ready in spring in a frame[K]. Cuttings of half-ripe wood, July/August in a frame. Very high percentage[113]. Cuttings of ripe wood, October/November in a frame.

nwatta Prefers a sound loamy neutral soil[1, 200]. Succeeds in semi-shade but full sun is best for fruit production[200]. Prefers a sheltered position[200]. A fairly hardy plant, succeeding in many parts of the country[1], but young spring growth is susceptible to frost damage[160]. Plants are semi-evergreen in mild winters[219]. Fruits are formed on second-year wood and also on fruit spurs on older wood[126], any pruning is best carried out in the winter[219]. The flowers are softly scented[245]. This is a climbing plant, supporting itself by twining around branches etc[200]. Plants are often erroneously labelled A. henryi in British nurseries[219]. Plants in this genus are notably resistant to honey fungus[200]. Dioecious. Male and female plants must be grown

if fruit and seed is required.

6.2.95 Crataegus flava

Summer Haw, Yellowleaf hawthorn

5 tlin 9 cyuc 3 kcaak 3 tcan 2 dwat 8 m hkuc hmimhtut cyutli hgatkyuctuphja7n hwicli hrasjlutnyikfrip hpa7tli flatprikliwislip hpa7tmwatli xre7t hjonli

drutta Crataegus flava is a deciduous Shrub growing to 8 m (26ft) by 10 m (32ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[46, 61, 95, 161]. well-flavoured[2]. Dried and mealy[82], it is highly esteemed in N. America as a wild fruit gathered for making jellies[183]. The yellow fruit is pear-shaped[245], it is up to 16mm in diameter and is borne in small clusters[229]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82]. dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta South-eastern N. America - Virginia to Florida, west to Mississippi. ksacta Open woods and low hills in dry sandy or gravelly soils[43, 82].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open,

to 2900 metres[51, 184].

propta Seed - best sown as soon as it is ripe in a cold frame[78]. It usually germinates in the spring[K]. 'Green' seed (harvested when the embryo has fully developed but before the seed case has dried) should be sown as soon as it is harvested and germinates within 6 weeks[K]. Stored seed should be sown as soon as possible in late winter or spring. 3 weeks cold stratification will improve its germination, which should take place in 3 - 6 months at 10°C. Prick out the seedlings when they are large enough to handle and grow them on in a cold frame for at least their first winter. Plant them out in late spring or early summer. Cuttings of half ripe wood 15cm long, July in individual pots in a frame[78]. Division of suckers in spring[78]. Whilst they can be placed direct into their permanent positions, better results are achieved if they are potted up and placed in a frame until established[11]. Leaf cuttings in the autumn.

nwatta An easily grown plant, it thrives in any good garden soil[11]. Grows well in heavy clay soils. Prefers a semi-shaded woodland position in a damp slightly acid to neutral humus rich soil[200]. Requires a position sheltered from cold or strong winds[1]. The plant is slightly tender in Britain[1] though it does well in Cornwall[59]. It under performs in areas where temperatures regularly fall below -10°C[200]. The young growth in spring can be damaged by late frosts[K]. Hybridizes freely with other members of this genus. The flowers have a delicate sweet fragrance[245]. At least one named variety has been developed for its ornamental value. 'Maharajah' appears to be harder than the type species[182]. Closely allied to *M. acanthifolia*[11] (which is quoted as a synonym of this species in some books). The differences stated between the two species do not hold true in the wild but in cultivation *M. acanthifolia* has leaflets with a dull surface, flowers in the autumn and is harder than many of the spring flowering introductions of *M. nepalensis*. Resistant to honey fungus[88].

6.2.134 Rubus amabilis

5 tlin 9 cyuc 3 kcaak 1 tcan 0 dwat 2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Rubus amabilis is a deciduous Shrub growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to July, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[1, 11, 61, 105]. Large with a good flavour[46]. A sweet taste[177]. The fruit is about 16mm in diameter[200].

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

nrakta E. Asia - China to the Himalayas. ksacta Scrambles on the forest floor, 1300 - 3800 metres[184]. Foothills, along ditches, montane valleys, slopes, forests, thickets, forest margins and roadsides at elevations of 1000 - 3700 metres[266].

propta Seed - requires stratification and is best sown in early autumn in a cold frame. Stored seed requires one month stratification at about 3°C and is best sown as early as possible in the year. Prick out the seedlings when they are large enough to handle and grow on in a cold frame. Plant them out into their permanent positions in late spring of the following year. Division in early spring or just before leaf-fall in the autumn[200].

nwatta Easily grown in a good well-drained loamy soil in sun or semi-shade[1, 11, 200]. Prefers a humus-rich soil[184]. Hardy to about -20°C[184]. A very ornamental plant[1]. This species is a raspberry with biennial stems, it produces a number of new stems each year from the perennial rootstock, these stems fruit in their second year and then die[200]. Plants in this genus are notably susceptible to honey fungus[200].

6.2.135 Alcea rosea

Hollyhock

5 tlin 9 cyuc 3 kcaak 3 tcan 2 dwat 2.4 m hkuc htut cyutli kyuctup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Alcea rosea is a PERENNIAL growing to 2.4 m (7ft) by 0.6 m (2ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: Flowers Leaves Oil Root StemEdible Uses: Oil TeaYoung leaves - raw or cooked[2, 55, 177]. A mild flavour, but the texture leaves something to be desired[K]. They have been used as a pot-herb, though they are not particularly palatable[4]. They can also be chopped up finely and added to salads[K]. Inner portion of young stems - raw[101]. Flower petals and flower buds - raw. Added to salads[183]. A nutritious starch is obtained from the root[183]. A refreshing tea is made from the flower petals[183].

tcanta Compost Dye Litmus Oil PaperA fibre obtained from the stems is used in papermaking[189]. The fibres are about 1.9mm long. The stems are harvested in late summer, the leaves are removed and the stems are steamed until the fibres can be removed. The fibres are cooked with lye for 2 hours and then ball milled for 3 hours or pounded with mallets. The paper is light tan in colour[189]. The flowers are an alternative ingredient of 'Quick Return' herbal compost activator[32]. This is a dried and powdered mixture of several herbs that can be added to a compost heap in order to speed up bacterial activity and thus shorten the time needed to make the compost[K]. The seed contains 12% of a drying oil[114, 240]. The red anthocyanin constituent of the flowers is used as a litmus[114]. A brown dye is obtained from the petals[168].

dwatta Antiinflammatory Astringent Demulcent Diuretic Dysentery Emollient FebrifugeThe flowers are demulcent, diuretic and emollient[4, 21]. They are useful in the treatment of chest complaints[4], and a decoction is used to improve blood circulation, for the treatment of constipation, dysmenorrhoea, haemorrhage etc[218]. The flowers are harvested when they are open and are dried for later use[238]. The shoots are used to ease a difficult labour[218]. The root is astringent and demulcent[240]. It is crushed and applied as a poultice to ulcers[218]. Internally, it is used in the treatment of dysentery[240]. The roots and the flowers are used in Tibetan medicine, where they are said to have a sweet, acrid taste and a neutral potency[241]. They are used in the treatment of inflammations of the kidneys/womb, vaginal/seminal discharge, and the roots on their own are used to treat loss of appetite[241]. The seed is demulcent, diuretic and febrifuge[240].

nrakta The original habitat is obscure, it is probably of hybrid origin. A garden escape in Britain[17]. ksacta Not known in a truly wild situation.

propta Seed - sow April/May or August/September in pots or in situ[200, 238]. Easily grown from seed, which usually germinates in about 2 - 3 weeks at 20°C[133, 268]. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division after flowering. Only use rust-free specimens. Root cuttings in December. Basal cuttings at almost any time of year.

nwatta Landscape Uses:Border, Container, Foundation, Specimen. Succeeds in most soils[1]. Poor soils should be enriched with organic matter[1, 111]. Prefers a heavy rich soil and a sheltered sunny position[200]. Plants are hardy to about -15°C[200]. A very ornamental plant, it is usually grown as a biennial due to its susceptibility to the fungal disease 'rust'[1, 200]. There are many named varieties[238]. Young plants, and also the young growth in spring, are very attractive to slugs[K]. Special Features:Attracts birds, Attracts butterflies, Suitable for cut flowers, Attractive flowers or blooms. The plant is heat tolerant in zones 10 through 3. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 de-

them out in late spring or early summer. Division of suckers in spring[78]. Whilst they can be placed direct into their permanent positions, better results are achieved if they are potted up and placed in a frame until established[11]. Leaf cuttings in the autumn.

nwatta An easily grown shrub, it thrives in any good garden soil[11] including heavy clays. Prefers a semi-shaded woodland position in a damp, slightly acid to neutral humus-rich soil[200]. Survives under very heavy tree shade[184]. Succeeds in poor soils when the leaves will often become bright red, especially if the plant is in full sun. The fully dormant plant is hardy to about -20°c[184], though the young growth in spring can be damaged by late frosts. Plants are very tolerant of pruning and can be cut right back into old wood if they have outgrown their welcome[182]. This species is closely related to *M. bealei*[11, 200]. It hybridizes freely with other members of the genus. The flowers have a delicious perfume[245]. The form 'Hiemalis' bears larger flower spikes which are almost as strongly scented as Lily of the Valley (*Convallaria majalis*)[245].

6.2.132 Cynara cardunculus

Cardoon

5 tlin 9 cyuc 3 kcaak 1 tcan 5 dwat 2 m hkuc htut cyutli hqatkyuctup hwicli hyhshrasjnutnykfrp hpa7tli flatprikliwshsom hpa7tmwatli xre7t hjonli

drutta *Cynara cardunculus* is a PERENNIAL growing to 2 m (6ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from August to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in saline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure.

kcaakta Edible Parts: Flowers Leaves Root StemEdible Uses: Curdling agentFlower buds - raw or cooked[33, 105]. A globe artichoke substitute[183]. The flower buds are a bit smaller than the globe artichoke and so are even more fiddly to use[K]. The buds are harvested just before the flowers open, they are then usually boiled before being eaten. Only the base of each bract is eaten, plus the 'heart' or base that the petals grow from [K]. The flavour is mild and pleasant and is felt by some people to be more delicate than the globe artichoke[K]. Stems - cooked and used as a celery substitute[2, 27, 33, 46, 61]. It is best to earth up the stems as they grow in order to blanch them and reduce their bitterness[4], these blanched stems can then be eaten cooked or in salads[105, 132, 183]. In Italy raw strips of the stems are dipped into olive oil[183]. We find these stems to be too bitter when eaten raw[K]. Young leaves - raw or cooked. Eaten as a salad by the ancient Romans[183]. Rather bitter[K]. Root-cooked like parsnips[27, 105, 183]. Tender, thick and fleshy, with an agreeable flavour[183]. The dried flowers are a rennet substitute, used for curdling plant milks[105, 183].

tcanta DyeThe plant is said to yield a good yellow dye[4], though the report does not say which part of the plant is used.

dwatta Anticholesterolemic Chologogue Digestive DiureticThe cardoon has become important as a medicinal herb in recent years following the discovery of cynarin. This bitter-tasting compound, which is found in the leaves, improves liver and gall bladder function, stimulates the secretion of digestive juices, especially bile, and lowers blood cholesterol levels[238, 254]. The leaves are anticholesterolemic, antirheumatic, chologogue, digestive, diuretic, hypoglycaemic and lithontripic[7, 21, 165]. They are used internally in the treatment of chronic liver and gall bladder diseases, jaundice, hepatitis, arteriosclerosis and the early stages of late-onset diabetes[238, 254]. The leaves are best harvested just before the plant flowers, and can be used fresh or dried[238].

nrakta S. Europe. ksacta Stony or waste places and in dry grassland, usually on clay[50].

propta Seed - sow early spring in a greenhouse. Germination is usually quick and good, prick out the seedlings into individual pots as soon as they are large enough to handle

and plant them out into their permanent positions during the summer. It would be prudent to give the plants some winter protection in their first year. The seed can also be sown in situ in April. Sow the seed 2cm deep, putting 2 or 3 seeds at each point that you want a plant[1]. Protect the seed from mice[1]. Division of suckers. This is best done in November and the suckers overwintered in a cold frame then planted out in April. Division can also be carried out in March/April with the divisions being planted out straight into their permanent positions, though the plants will be smaller in their first year.

nwatta Industrial Crop: Biomass Management: Hay Management: Standard Staple Crop: OilPrefers a light warm soil and an open position in full sun[37, 200]. For best results, this plant requires plenty of moisture in the growing season and a good rich soil[16, 27, 33, 37], though another report says that it is drought tolerant once established[190]. Plants grew very well with us in the hot and very dry summer of 1995, though they were looking very tatty by September[K]. Tolerates most soils including heavy clays of both acid and alkaline nature, especially when grown in heavier or more spartan soils[200]. Plants are reasonably wind resistant[200, K]. This species is hardy to about -10°c[187]. Plants are more likely to require protection from winter cold when they are grown in a heavy soil[190]. Wet winters can do more harm than cold ones[K]. At one time the cardoon was often grown for its edible stems but it has now fallen into virtual disuse[132]. There are some named varieties[183]. It is a very ornamental foliage plant and makes a very attractive feature in the garden. The leaves are long lasting in water and are often used in flower arrangements[233]. Recent taxonomic revisions (1999) have seen the globe artichoke being merged into this species. However, since from the gardener's point of view it is quite a distinctive plant, we have decided to leave it with its own entry in the database under *Cynara scolymus*[K]. Plants seem to be immune to the predations of rabbits[233]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fleshy. Thick or swollen - fibrous or tap root [2-1].

6.2.133 Mahonia napaulensis

5 tlin 9 cyuc 3 kcaak 0 tcan 2 dwat 2.5 m hkuc hmimhtut cyutli tcup hwicli hrasjnutnykfrp hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Mahonia napaulensis* is an evergreen Shrub growing to 2.5 m (8ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf all year, in flower from March to April. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcaakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[272]. An acid flavour, but it is rather nice raw especially when added to muesli or porridge[K]. Unfortunately, there is relatively little flesh and a lot of seeds[K]. The fruit can also be dried and used as raisins[2, 51, 158, 177]. The ovoid fruit is about 12mm long[200].

tcanta DyeA yellow dye is obtained from the stem and leaves[61].

dwatta Antibacterial Antitumor Dysentery Ophthalmic TonicThe fruits are said to be diuretic and demulcent[240, 272]. They are used in the treatment of dysentery[240]. A decoction of the bark is used as eye drops to treat inflammations of the eyes[272]. Berberine, universally present in rhizomes of *Mahonia* species, has marked antibacterial effects[218] and is used as a bitter tonic[213]. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with *Glycyrrhiza* species (*Liquorice*) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218]. The root and root bark are best harvested in the autumn[213].

nrakta E. Asia - Bhutan, Nepal, Sikkim and Uttar Pradesh. ksacta Dense wet oak and rhododendron forests

the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. The fruit is sparsely produced in Britain[11]. A tree at Kew in September 1993 was fruiting heavily[K].

6.2.96 Crataegus pinnatifida

Chinese Haw

5 tlin 9 cyuc 3 kcaak 2 tcan 3 dwat 7 m hkuc hmimhtut cyutli hgattcuphja7n hwicli hrasjnutnykfrp hpa7tli flatprikliwsslip hpa7tmwatli xre7t hjonli

drutta *Crataegus pinnatifida* is a deciduous Tree growing to 7 m (23ft) by 7 m (23ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in May, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcaakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177]. A pleasant flavour[178]. The orange fruit has a mealy texture with an acid taste and a slight bitterness but is fairly nice raw[K]. It ripens fairly late, specimens seen at the end of October 1998 were not quite fully ripe[K]. The fruit can be used in making pies, preserves, etc. and can also be dried for later use. The fruit is about 15mm in diameter[200], though in some forms it can be 25mm in diameter[266]. A nutritional analysis is available[218]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Alternative Antibacterial Anticholesterolemic Antidote Antiscorbatic Cardio tonic Deobstruent Hypotensive Laxative Stimulant Stomachic VasodilatorThe fruit is antibacterial, anticholesterolemic, cardiotoxic, hypotensive, stomachic, vasodilator. It contains several medically active constituents including flavonoids and organic acids[279]. It has been shown to lower blood cholesterol levels and to improve blood circulation[176, 238, 279]. It is used in Korea in the treatment of abdominal distension, pain, diarrhoea and to induce menstruation[279]. The dried fruit is alternative, antiscorbatic, deobstruent, laxative, stimulant and stomachic[218]. The fruits and flowers of hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222]. The seed is recommended in the treatment of difficult labour, hernia and swollen genitals[218]. The leaves and twigs are used as an antidote to varnish poisoning (from certain *Rhus* spp)[218]. The root is used in the treatment of nausea and vomiting[218].

nrakta E. Asia - N. China, Korea. ksacta Riverbanks, on sandy soils or stony slopes[74]. Among shrubs, on slopes at elevations of 100 - 2000 metres[266].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°c and then cold stratified for another 3 months at 4°c[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to

pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta Industrial Crop: Medicinal Management: Standard Minor Global CropA very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Most trees have very few thorns, some forms are thorn-free[202]. A very ornamental plant[1, 11]. The sub-species *C. pinnatifida major* has larger fruit than the type species, it is cultivated for this fruit in China[46, 178, 200] Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

6.2.97 Pyrus pyraster

5 tlin 9 cyuc 3 kcaak 0 tcan 0 dwat 7 m hkuc hmimhtut cyutli hgattcup hwicli hrasjnutnykfrp hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Pyrus pyraster* is a deciduous Tree growing to 7 m (23ft) by 5.5 m (18ft). See above for USDA hardiness. It is hardy to UK zone 6. The seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. It can tolerate atmospheric pollution.

kcaakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[177]. The fruit is often borne in abundance and is up to 35mm in diameter. It ripens in late summer to early autumn. It is rather hard and astringent at first, but bleets as soon as it falls from the tree and then has quite a good flavour, becoming soft and quite juicy[K].

nrakta C. and S.W. Europe. ksacta Thickets and open woods[50].

propta Seed - best sown in a cold frame as soon as it is ripe in the autumn, it will then usually germinate in mid to late winter. Stored seed requires 8 - 10 weeks cold stratification at 1°c and should be sown as early in the year as possible[200]. Temperatures over 15 - 20°c induce a secondary dormancy in the seed[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for their first year. Plant them out in late spring or early summer of the following year.

nwatta Prefers a good well-drained loam in full sun[200]. Grows well in heavy clay soils. Tolerates light shade but does not fruit so well in such a position. Tolerates atmospheric pollution, excessive moisture and a range of soil types if they are moderately fertile[200]. Established plants are drought tolerant[200]. Plants are hardy to about -15°c[200].

6.2.98 Crataegus pentagyna

5 tlin 9 cyuc 3 kcaak 0 tcan 2 dwat 6 m hkuu
hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnykriqhp7tli
flatprikliwssip hpa7tmwatli xre7t hjonli

drutta Crataegus pentagyna is a deciduous Tree growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 46, 105]. It can also be made into preserves[61] and can be dried for later use. The fruit is about 1cm in diameter[200]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta S.E. Europe to the Caucasus. ksacta Woodland margins[45, 50].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Cultivated in China for its edible fruit, it is sold in the local markets[46, 61]. This report might be a mistake, probably applying instead to *C. pinnatifida*[K] Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

6.2.99 Amelanchier huroensis

5 tlin 9 cyuc 3 kcaak 0 tcan 0 dwat 6 m hkuu
hmimhtut cyutli tcup hwicli hrasjlutnykriqhp7tli flatprikliw
wis hpa7tmwatli fyfkr7e7t hjonli

drutta Amelanchier huroensis is a deciduous Tree growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[177]. The fruit is rich in iron and copper[226]. nrakta North-western N. America - Ontario, Michigan, Wisconsin and Minnesota. ksacta Open woods, cliffs and shores, chiefly on trap or other basic rocks[43].

propta Seed - it is best harvested 'green', when the seed is fully formed but before the seed coat has hardened, and then sown immediately in pots outdoors or in a cold frame. If stored seed is obtained early enough in the autumn, it can be given 4 weeks warm stratification before being left out in the winter and it should then germinate in the spring. Otherwise seed can be very slow to germinate, perhaps taking 18 months or more. When large enough to handle, prick the seedlings out into individual pots and grow them on in a sheltered outdoor position, planting them out once they are 20cm or more tall. If there is sufficient seed it is best to sow it thinly in an outdoor seedbed[78, 80]. Grow the seedlings on for two years in the seedbed before planting them out into their permanent positions during the winter. Layering in spring - takes 18 months[78]. Division of suckers in late winter. The suckers need to have been growing for 2 years before you dig them up, otherwise they will not have formed roots. They can be planted out straight into their permanent positions if required.

nwatta We have very little information on this species and do not know if it will be hardy in Britain, though judging by its native range it should succeed outdoors in most parts of the country. The following notes are based on the general needs of the genus. Prefers a rich loamy soil in a sunny position or semi-shade[1, 200] but thrives in any soil that is not too dry or water-logged[11]. Grows well in heavy clay soils. All members of this genus have edible fruits and, whilst this is dry and uninteresting in some species, in many others it is sweet and juicy. Many of the species have potential for use in the garden as edible ornamentals. The main drawback to this genus is that birds adore the fruit and will often completely strip a tree before it is fully ripe[K]. Hybridizes freely with other members of this genus[200]. Grafting onto seedlings of *A. lamarkii* or *Sorbus acuparia* is sometimes practised in order to avoid the potential problem of hybridizing[1].

6.2.100 Crataegus aprica

5 tlin 9 cyuc 3 kcaak 0 tcan 2 dwat 6 m hkuu
hmimhtut cyutli hgatkuyctcuphja7n hwicli hrasjlutnykriqhp7tli
flatprikliwssip hpa7tmwatli xre7t hjonli

drutta Crataegus aprica is a deciduous Tree growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in May, and the seeds ripen in November. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. A good dessert fruit, it is sweet and rather juicy[82]. The fruit can be used in making pies, preserves, etc, and can also be dried for later use. The fruit is about 12mm in diameter[200]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. A pleasant sub-acid flavour, though there are a lot of seeds to relatively little flesh[K]. Children generally love this fruit, along with some adults, though most adults seem to prefer it cooked in pies, preserves etc[K]. The fruits are about 7mm long[200].

tcanta DyeA yellow dye is obtained from the root. dwatta Antibacterial Cancer DysenteryBerberine, universally present in rhizomes of Berberis species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with *Glycyrrhiza* species (Licorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta A garden hybrid, *B. darwinii*. x *B. linearifolia* ksacta Not known in the wild.

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. This plant does not breed true from seed because it is a hybrid species. Most of the seedlings seedlings revert back to one of the parents, usually *B. darwinii*[11]. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78]. Suckers, removed in late autumn/early winter and planted out in situ or potted up and planted out in late spring[200].

nwatta Prefers a warm moist loamy soil and light shade but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. Grows well on chalky soils[11]. Plants are hardy to about -15°C[184]. A very ornamental plant[1], there are several named varieties[182]. The cultivar 'Mystery Fire' bears very large crops of fruit, even on small plants[K]. A good bee plant[108], the flowers are very fragrant. Plants can be pruned back quite severely, they resprout well from the base[200].

6.2.130 Ribes himalense

5 tlin 9 cyuc 3 kcaak 0 tcan 1 dwat 2 m hkuu
hmimhtut cyutli tcup hwicli hrasjlutnykriqhp7tli flatprikliw
wis hpa7tmwatli xre7t hjonli

drutta Ribes himalense is a deciduous Shrub growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from April to June, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[51, 272]. The fruit is quite large, but so are the seeds[200]. The fruit is red, turning purplish black on maturity and is about 7mm in diameter[266].

dwatta Astrigent Dysentery PoulitceThe juice of the leaf is used in the treatment of diarrhoea and dysentery[272]. A paste of the leaves is applied to cuts and wounds[272].

nrakta E. Asia - Himalayas to China. ksacta Mixed, coniferous, or broad-leaved forests and forest margins, thickets on mountain slopes, river banks, or in ravines, grasslands on mountain slopes, mountain valleys, stream banks, roadsides[266].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. Stored seed requires 4 - 5 months cold stratification at between 0 to 9°C and should be sown as early in the year as possible[113, 164]. Under normal storage conditions the seed can remain viable for 17 years or more. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter, planting them out in late spring of the following year. Cuttings of half-ripe wood, 10 - 15cm with a heel, July/August in a frame[78, 113]. Cuttings of mature wood of the current year's growth, preferably with a heel of the previous year's growth, November to February in a cold frame or sheltered bed outdoors[78, 200].

nwatta Easily grown in a moisture retentive but well-drained loamy soil of at least moderate quality[11, 200]. Plants are quite tolerant of shade though do not fruit so well in such a position[11]. Hardy to about -20°C[200]. This species is closely related to *R. petraeum*[200]. Plants can harbour a stage of white pine blister rust, so should not be grown in the vicinity of pine trees[155]. Plants in this genus are notably susceptible to honey fungus[200].

6.2.131 Mahonia japonica

5 tlin 9 cyuc 3 kcaak 0 tcan 2 dwat 2 m hkuu
pimhmimhtut cyutli tcup hwicli hyishrasjlutnykriqhp7tli
flatprikliwis hpa7tmwatli xre7t hjonli

drutta Mahonia japonica is an evergreen Shrub growing to 2 m (6ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from February to April, and the seeds ripen from April to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. An acid flavour, but it is rather nice raw especially when added to muesli or porridge[K]. Unfortunately, there is relatively little flesh and a lot of seeds[K]. The ovoid fruit is about 9mm long[200], it ripens in spring and crops can be quite good if the plant is in a sheltered position[K]. The fruit is produced in large clusters and so is easy to harvest[K].

dwatta Antibacterial Antirheumatic Antitumour Antitusive Cancer Depurative Dysentery Expectorant Febrifuge TonicThe leaf is febrifuge and is used as a tonic in cases of cancer[218]. The seed is febrifuge and tonic[218]. The roots and stems are antirheumatic, antitusive, depurative, expectorant and febrifuge[147, 218]. A decoction is used in the treatment of bone-breaking fevers, dizziness and tinnitus, backache, weak knees, dysentery and enteritis[147]. The root and root bark are best harvested in the autumn[213]. Berberine, universally present in rhizomes of Mahonia species, has marked antibacterial effects[218] and is used as a bitter tonic[213]. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with *Glycyrrhiza* species (Licorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta E. Asia - China, Taiwan. ksacta Damp woodlands in upland areas[147, 200]. Not found in a truly wild situation, this species is possibly only a cultigen.

propta Seed - best sown as soon as it is ripe in a cold frame[78]. It usually germinates in the spring[K]. 'Green' seed (harvested when the embryo has fully developed but before the seed case has dried) should be sown as soon as it is harvested and germinates within 6 weeks[K]. Stored seed should be sown as soon as possible in late winter or spring. 3 weeks cold stratification will improve its germination, which should take place in 3 - 6 months at 10°C. Prick out the seedlings when they are large enough to handle and grow them on in a cold frame for at least their first winter. Plant

nwatta An easily grown plant, succeeding in a good loam and an open sunny position[1, 111, 200] but also tolerating some shade[188]. Prefers a slightly alkaline soil in a position sheltered from strong winds[200]. Another place in this report says that the plant tolerates maritime exposure[200]. Tolerates poor and dry soils and some shade[200]. Dislikes acid soils[1]. Established plants are drought tolerant[190]. Plants are hardy to about -20°C[187]. A deep-rooted plant[233], it dislikes root disturbance. The young growth in spring is adored by slugs[K]. Plants can be grown in the summer meadow if the grass is not cut too low, since this would damage the growing point[200]. The flowers emit a delicious wallflower-like scent in hot sunny weather[245].

6.2.127 Zanthoxylum piperitum

Japanese Pepper Tree

5 tlin 9 cyuc 3 ckak 1 tcan 2 dwat 2 m hkuc hmimhtut cyutiI tcup hwicli hrasjIutnyik hpa7tli flatprikliws hpa7tmwatli nyanhjen hjonli

drutta Zanthoxylum piperitum is a deciduous Shrub growing to 2 m (6ft) by 2 m (6ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from April to June. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

ckakta Edible Parts: Fruit Leaves SeedEdible Uses: CondimentSeed - cooked. It is ground into a powder and used as a condiment, a pepper substitute[1, 2, 11, 34, 183]. The fruit can also be used[116]. It is often heated in order to bring out its full flavour and can be mixed with salt for use as a table condiment[183]. The ground and dry-roasted fruit is an ingredient of the Chinese 'five spice powder'[238]. The bark and leaves are used as a spice[2, 105, 238]. Young leaves - raw or cooked. They are used in soups or as a flavouring in salads[177, 179, 183].

tcanta ParasiticideIn Japan, the thick wood of the tree is traditionally made into a gnarled and rough-hewn wooden pestle, to use with suribachi.

dwatta Antibacterial Antifungal Antiperiodic Antitussive Carminative Diuretic Parasiticide Stimulant StomachicAntiperiodic, antitussive, carminative, diuretic, parasiticide, stimulant[178]. The fruit contains an essential oil, flavonoids and isoquinoline alkaloids[279]. It is anthelmintic, antibacterial, antifungal and stomachic[279]. It inhibits the synthesis of prostaglandin and, in larger doses, is toxic to the central nervous system[279]. It is used in Korea in the treatment of tuberculosis, dyspepsis and internal parasites[279]. The resin contained in the bark, and especially in that of the roots, is powerfully stimulant and tonic[82].

nrakta E. Asia - N. China, Japan, Korea. ksacta Scrub and hedges in hills and mountains in Japan[58, 184].

propta Seed - best sown in a greenhouse as soon as it is ripe in the autumn. Stored seed may requires up to 3 months cold stratification, though scarification may also help[113]. Sow stored seed in a cold frame as early in the year as possible. Germination should take place in late spring, though it might take another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant them out in early summer. Cuttings of half-ripe wood, July/August in a frame. Root cuttings, 3cm long, planted horizontally in pots in a greenhouse. Good percentage[78]. Suckers, removed in late winter and planted into their permanent positions[113].

nwatta Easily grown in loamy soils in most positions, but prefers a good deep well-drained moisture retentive soil in full sun or semi-shade[1, 11, 200]. A very ornamental plant[1], it is hardy to about -15°C[184]. Flowers are formed on the old wood[206]. The bruised leaves are amongst the most powerfully aromatic of all leaves[245]. Dioecious. Male and female plants must be grown if seed is required. Self-sown seedlings have occasionally been observed growing in bare soil under the parent plant[K]. A good forest garden plant. Some reports suggest it can grow in deep shade. For polyculture design as well as the above-ground architecture

(form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A clumping plant, forming a colony from shoots away from the crown but with a limited spread [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

6.2.128 Berberis x carminea

5 tlin 9 cyuc 3 ckak 1 tcan 2 dwat 2 m hkuc hmimhtut cyutiI tcup hwicli hyihshrasjIutnyikfrip hpa7tli flatprikliwssip hpa7tmwatli fyfjxre7t hjonli

drutta Berberis x carminea is a deciduous Shrub growing to 2 m (6ft) by 2 m (6ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. The seeds ripen from September to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

ckakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. A pleasant though strongly acid flavour, it goes well in a muesli[K]. Most children, and a few adults, really like the fruit raw, but in general most people will prefer to cook it[K]. The fruits are about 10mm in diameter[200].

tcanta DyeA yellow dye is obtained from the root. dwatta Antibacterial Antitumor DysenteryBerberine, universally present in rhizomes of Berberis species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Licuorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta A range of garden hybrids involving B. aggregata as one parent with other closely related species. ksacta Not known in the wild.

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. This plant does not breed true from seed because it is a hybrid species. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78]. Suckers, removed in late autumn/early winter and planted out in situ or potted up and planted out in late spring[200].

nwatta Prefers a warm moist loamy soil and light shade but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. Grows well on chalky soils[11]. Plants are hardy to about -15°C[184]. A very ornamental plant[1], there are several named varieties[182]. The cultivar 'Buccaneer' bears very large crops of large fruits, even on small plants[K]. A good bee plant[108], the flowers are very fragrant. Plants can be pruned back quite severely, they resprout well from the base[200].

6.2.129 Berberis x lologensis

5 tlin 9 cyuc 3 ckak 1 tcan 2 dwat 2.5 m hkuc hmimhtut cyutiI tcup hwicli hyihshrasjIutnyikfrip hpa7tli flatprikliwssip hpa7tmwatli fyfjxre7t hjonli

drutta Berberis x lologensis is an evergreen Shrub growing to 2.5 m (8ft) by 2.5 m (8ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf all year; in flower from April to May,

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotoxic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta South-eastern N. America - Virginia to Tennessee and Georgia. ksacta Dry woods in the foothills of the Appalachians, 450 - 1000 metres[82].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them out in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

6.2.101 Phyllostachys flexuosa

Zig-Zag Bamboo, Drooping timber bamboo

5 tlin 9 cyuc 3 ckak 2 tcan 0 dwat 6 m hkuc hmim cyutiI tcup hwicli hrasjIutnyik hpa7tli flatprikliws hpa7tmwatli xre7t hjonli

drutta Phyllostachys flexuosa is an evergreen Bamboo growing to 6 m (19ft) by 6 m (19ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

ckakta Edible Parts: Shoots StemEdible Uses: Young shoots - cooked[25, 61, 105, 177]. A delicious flavour[266]. Slightly acid raw, they are usually boiled in at least one change of water and added to salads etc[183]. The canes are about 10mm in diameter[K]. The shoots, which are generally 2-4cm in diameter, though occasionally up to 7cm[266], are harvested in the spring when they are about 8cm above the ground, cutting them about 5cm below soil level.

tcanta Basketry WoodThe canes are not of the highest quality but can be used for plant supports etc. The medium

quality wood is good for all standard bamboo uses for canes of this size[195]. The culms are used as handles of tools[266]. The splints made from the stems are used for weaving articles[266].

nrakta E. Asia - China. ksacta Not known

propta Seed - surface sow as soon as it is ripe in a greenhouse at about 20°C. Do not allow the compost to dry out. Germination usually takes place fairly quickly so long as the seed is of good quality, though it can take 3 - 6 months. Grow on in a lightly shaded place in the greenhouse until large enough to plant out. Seed is rarely available. Division in spring as new growth commences. Divisions from the open ground do not transplant well, so will need careful treatment and nurturing under cover in pots until at least late spring[238]. Division is best carried out in wet weather and small divisions will establish better than large clumps[238]. Another report says that you can take large divisions from established clumps and transfer them straight to their permanent positions, misting or drenching them frequently until they are established[200]. Basal cane cuttings in spring.

nwatta Requires a rich damp soil in a sheltered position[200] and plenty of moisture in the growing season[1]. A very hardy plant, tolerating temperatures down to about -17°C. According to another report the plant only suffers minor leaf damage at -22°C[195]. The plants dislike prolonged exposure to hard frosts[200]. This species is notably resistant to honey fungus[200]. Plants only flower at intervals of many years. When they do come into flower most of the plants energies are directed into producing seed and consequently the plant is severely weakened. They sometimes die after flowering, but if left alone they will usually recover though they will look very poorly for a few years. If fed with artificial NPK fertilizers at this time the plants are more likely to die[122]. A plant at Trebah gardens in Cornwall was flowering heavily in May 1995[K]. This is a good companion species to grow in a woodland because the plants are shallow rooted and do not compete with deep rooted trees[195]. The rootstock is running[25] but not aggressively so, especially in the cooler climate of Britain[200]. New growth appears from late March[25]. This species is closely related to P angustata[266]. Plants need quite a lot of space because the outer culms spread out sideways and arch over[162].

6.2.102 Prunus incisa

Fuji Cherry

5 tlin 7 cyuc 3 ckak 2 tcan 1 dwat 6 m hkuc hmimhtut cyutiI tcup hwicli hrasjIutnyik hpa7tli flatprikliws hpa7tmwatli xre7t hjonli

drutta Prunus incisa is a deciduous Shrub growing to 6 m (19ft) by 6 m (19ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from March to April. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

ckakta Edible Parts: Fruit SeedEdible Uses: Fruit - raw or cooked[2, 105, 177, 183]. A fairly small fruit, about 8mm in diameter with one large seed[200]. Seed - raw or cooked. Do not eat the seed if it is too bitter - see the notes above on toxicity.

tcanta Dye Hedge HedgeA green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168]. Plants can be grown as a hedge[200].

dwatta Although no specific mention has been seen for this species, all members of the genus contain amygdalin and

prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta E. Asia - Japan. ksacta Woods in the mountains of C. Japan[58].

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200]. Softwood cuttings from strongly growing plants in spring to early summer in a frame[200]. Layering in spring.

nwatta Landscape Uses:Specimen. Thrives in a well-drained moisture-retentive loamy soil[11, 200]. Prefers some lime in the soil but is likely to become chlorotic if too much lime is present[1]. Succeeds in sun or partial shade though it fruits better in a sunny position[11, 200]. Plants are hardy to about -20°C[184]. A very ornamental plant[11], but it is slow growing[1]. A tree in a very windy position in Cornwall was 2 metres tall in spring 1994 when 4 years old and was flowering heavily[K]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features: Not North American native, All or parts of this plant are poisonous, Blooms are very showy.

6.2.103 Crataegus hupehensis

5 tlin 9 cyuc 3 kcaok 0 tcan 2 dwat 5 m hkuc hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwissip hpa7tmwatli xre7t hjonli

drutta Crataegus hupehensis is a deciduous Tree growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from May to June, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kckahta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[46, 105, 177, 200]. Esteemed in China, the fruit is large but insipid[61]. The fruit is up to 2.5cm in diameter[200, 266]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta E. Asia - W. China. ksacta Thickets on slopes at elevations of 500 - 2000 metres in Henan, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Shanxi, Sichuan and Zhejiang Provinces[266].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°C and then cold stratified for another 3 months at 4°C[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting

the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. Cultivated for its edible fruit in China[46, 61, 109].

6.2.104 Corylus sieboldiana

Japanese Hazel, Manchurian hazel

5 tlin 9 cyuc 3 kcaok 1 tcan 0 dwat 5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwissip hpa7tmwatli xre7t hjonli

drutta Corylus sieboldiana is a deciduous Shrub growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 6. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

kckahta Edible Parts: Oil SeedEdible Uses: OilSeed - raw or cooked[183]. Rich in oil. The seed ripens in mid to late autumn and will probably need to be protected from squirrels[K]. When kept in a cool place, and not shelled, the seed should store for at least 12 months[K]. An edible oil is obtained from the seed[183].

nrakta E. Asia - Japan. ksacta Not known

propta Seed - best sown as soon as it is harvested in autumn in a cold frame[164]. Germinates in late winter or spring. Stored seed should be pre-soaked in warm water for 48 hours and then given 2 weeks warm followed by 3 - 4 months cold stratification[164]. Germinates in 1 - 6 months at 20°C[164]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame or sheltered place outdoors for their first winter. Plant them out into their permanent positions in late spring or early summer[K]. Layering in autumn. Easy, it takes about 6 months[78, 200]. Division of suckers in early spring. Very easy, they can be planted out straight into their permanent positions.

nwatta Management: Coppice Management: Standard Regional Crop Staple Crop: Protein-oilAn easily grown plant, it succeeds in most soils, but is in general more productive of seeds when grown on soils of moderate fertility[11, 200]. It does less well in rich heavy soils or poor ones[11, 63]. Does well in a loamy soil[11]. Very suitable for an alkaline soil[11], but it dislikes very acid soils[17]. Plants are fairly wind tolerant[1, 11]. Members of this genus bear transplanting well and can be easily moved even when relatively large[11].

body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Licorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumor activity[218].

nrakta E. Asia - Himalayas ksacta Shrubby and open hillsides[51, 67], usually on hot dry slopes[146], to 3000 metres. in Kashmir[57].

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78].

nwatta Prefers a warm moist loamy soil and light shade but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. A fairly hardy plant but it suffers some damage in severe winters[1]. Hybridizes freely with other members of this genus[1]. Plants can be pruned back quite severely, they resprout well from the base[200].

6.2.125 Rheum palmatum tanguticum

Da Huang

5 tlin 9 cyuc 3 kcaok 0 tcan 5 dwat 2 m hkuc hmimhtut cyutli tcup hwicli jlutnyikfrip hpa7tli flatpriklwissip hpa7tmwatli xre7t hjonli

drutta Rheum palmatum tanguticum is a PERENNIAL growing to 2 m (6ft) by 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been seen for this species, the leaves of some if not all members of this genus contain significant quantities of oxalic acid and should not be eaten in any quantity. Oxalic acid can lock up certain minerals in the body, especially calcium, leading to nutritional deficiency. The content of oxalic acid will be reduced if the plant is cooked. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238]. See Rheum palmatum for possible related information.

kckahta Leaf stem - raw or cooked[2, 7, 105, 183]. The stem is superior in flavour to the common rhubarb and quite tender[2]. An AC flavoured, it is sometimes used as a cooked fruit substitute[K].

dwatta Anticholesterolemic Antiseptic Antispasmodic Antitumor Astringent Chologogue Diuretic Haemostatic PurgativeRhubarb has a long and proven history of herbal usage, its main effect being a positive and balancing effect upon the whole digestive system. It is one of the most widely used herbs in Chinese medicine[238]. The root is anticholesterolemic, antiseptic, antispasmodic, antitumor, aperient, astringent, chologogue, demulcent, diuretic, laxative, purgative, stomachic and tonic[4, 7, 9, 21, 91, 171, 176, 238]. The roots contain anthraquinones, which have a purgative effect, and also tannins and bitters, which have an opposite astringent effect[244]. When taken in small doses, it acts as an astringent tonic to the digestive system, whilst larger doses act as a mild laxative[232, 244]. The root is taken internally in the treatment of chronic constipation, diarrhoea, liver and gall bladder complaints, haemorrhoids, menstrual problems and skin eruptions due to an accumulation of toxins[238]. This remedy is not prescribed for pregnant or

lactating women, nor for patients with intestinal obstruction[238]. Externally, the root is used in the treatment of burns[238]. The roots are harvested in October from plants that are at least six years old, they are then dried for later use[4]. A homeopathic remedy is prepared from the dried root[232]. This is used especially in the treatment of diarrhoea in teething children[232].

nrakta E. Asia - N.W. China. ksacta Valleys at elevations of 1600 - 3000 metres in Gansu, Qinghai and Xizang Provinces[266].

propta Seed - best sown in autumn in a shaded cold frame[200]. The seed can also be sown in spring in a cold frame. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse or cold frame for their first winter, planting them out in the spring. Division in early spring or autumn[1, 111]. Divide up the rootstock with a sharp spade or knife, making sure that there is at least one growth bud on each division. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Prefers a deep, fertile, moderately heavy, humus rich, moisture retentive, well-drained soil in sun or semi-shade[200]. Grows well in heavy clay soils. Plants can be grown in quite coarse grass, which can be cut annually in the autumn[233]. This is a more robust form of the species[200], it is hardy to at least -15°C[238]. This sub-species is favoured for its medicinal properties over the species[244] and is cultivated as a medicinal plant in China[187]. Plants in this genus seem to be immune to the predations of rabbits[233]. Hybridizes freely with other members of this genus[200].

6.2.126 Crambe cordifolia

Flowering sea kale

5 tlin 9 cyuc 3 kcaok 3 tcan 1 dwat 2 m hkuc hmimhtut cyutli hgatkyuctup hwicli hyishrasjlutnyik hpa7tli prikklwissip hpa7tmwatli xre7t hjonli

drutta Crambe cordifolia is a PERENNIAL growing to 2 m (6ft) by 1.2 m (4ft in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in June, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

kckahta Edible Parts: Leaves RootEdible Uses: Leaves - cooked[2, 105, 177]. Used as a potherb[183]. Young leaves have a pleasant cabbage-like flavour, though older leaves are rather tough[K]. Root - cooked[2, 145, 177].

tcanta Plants can be used for ground cover when planted about 1.2 metres apart each way. They form large clumps[208].

dwatta AntipruriticThe plant is used as a cure for itch[240].

nrakta W. Asia - Afghanistan and Iran. ksacta Grows on the steppes and open stony places[74, 187].

propta Seed - sow March/April in a seedbed outdoors and either thin the plants out or move them to their permanent positions when about 10cm tall[111]. The young plants are very attractive to slugs so some protection will often be needed. Germination can be slow so it is best to sow the seed in pots in a cold frame[164]. Germination usually takes place in 3 - 26 weeks at 15°C[164]. Prick out the seedlings into individual pots as soon as they are large enough to handle and plant out into their permanent positions when they are at least 10cm tall. Division in spring or autumn[1, 111]. Dig up the root clump and cut off as many sections as you require, making sure they all have at least one growing point. The larger of these divisions can be planted out straight into their permanent positions, though small ones are best potted up and grown on in a cold frame until they are established. Root cuttings, 3 - 10 cm long, in spring[104]. These can be planted straight into the open ground or you can pot them up in the greenhouse and plant them out once they are growing strongly.

spring. Layering of current seasons growth in July/August. Takes 15 months[78].

nwatta Landscape Uses:Border, Hedge, Massing, Specimen. An easily grown plant, it succeeds in most soils but is ill-adapted for poor soils and for dry situations[1]. It prefers a deep rich loamy soil in full sun or in semi-shade[11, 200]. Best if given shade from the early morning sun in spring[200]. Requires shelter from N. and E. winds[200]. Plants are hardy to about -20°c[184]. A very ornamental plant[1], it flowers in the winter and the flowers are said to withstand temperatures down to -12°c without damage[11, 200]. The flowers diffuse a sweet and cloying perfume of heliotrope[245]. The fruit, however, is not often produced in this country[K]. This may be due to the plant being self-incompatible and so growing 2 or more different cultivars together may improve fruit set[11, 200]. Hand pollination may also be beneficial as well as siting the plants so that they get the maximum of protection from severe winter weather[K]. A west-facing wall or woodland edge would be ideal for this[K]. The plants flower on terminal and lateral clusters of the current years growth, any pruning is best carried out in the spring[219]. This species has long been known as *V. fragrans*, but this name is invalid[11]. It is closely related to *V. grandiflorum*[11]. Special Features:Not North American native, Fragrant flowers, Attractive flowers or blooms.

6.2.123 Rheum australe

Himalayan Rhubarb
5 tlin 9 cyuc 3 kcaak 2 tcan 3 dwat 3 m hkuc
hmimhtut cyutli tcup hwicli jltutnyikfrip hpa7tli flatprikliw hpa7tmwatli xre7t hjonli

drutta Rheum australe is a PERENNIAL growing to 3 m (9ft) by 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to July, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been seen for this species, the leaves of some if not all members of this genus contain significant quantities of oxalic acid and should not be eaten in any quantity. Oxalic acid can lock up certain minerals in the body, especially calcium, leading to nutritional deficiency. The content of oxalic acid will be reduced if the plant is cooked. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kckaKa Edible Parts: StemEdible Uses: RutinLeaf stem - raw or cooked[22, 105, 183]. An excellent flavour that is something like apples[2, 183] (this is likely to be a cooking apple!). The crop is sometimes blanched by excluding light from the growing stems, this produces an almost white stem that is free of fibre, crisp and less acid[2]. This species makes an excellent late crop[2]. The stems can also be made into a preserve or be dried and stored for later use[183]. One report says that the plant contains 0.32% rutin[240]. It does not specify which part of the plant, though it is likely to be the leaves[K].

tcanta Dye LiningThe leaves can be up to 1 metre in diameter, they are used as a lining material and also to cover and protect fruit in baskets[2, 37]. A bright yellow dye is obtained from the root[272].

dwatta Digestive Purgative TonicRhubarb has a long and proven history of herbal usage, its main effect being a positive and balancing effect upon the whole digestive system. It is one of the most widely used herbs in Chinese medicine[238]. The main species used is *R. palmatum*. Though the chemistry varies slightly, this species is used interchangeably[238]. The root is anticholesterolemic, anti-septic, antispasmodic, antitumor, aperient, astringent, cholagogue, demulcent, diuretic, laxative, purgative, stomachic and tonic[4, 37, 57, 61, 171, 238, 240]. Small doses act as an astringent tonic to the digestive system, whilst larger doses act as a mild laxative[232]. The root is taken internally in the treatment of chronic constipation, diarrhoea, liver and gall bladder complaints, haemorrhoids, menstrual problems and

skin eruptions due to an accumulation of toxins[238]. This remedy is not prescribed for pregnant or lactating women, nor for patients with intestinal obstruction[238]. Externally, the root is used in the treatment of burns[238]. The roots are harvested in October from plants that are at least six years old, they are then dried for later use[4]. A homeopathic remedy is prepared from the dried root[232]. This is used especially in the treatment of diarrhoea in teething children[232].

nrakta E. Asia - Himalayas. ksacta Open slopes on rocky ground at elevations of 3200 - 4200 metres[51, 272]. Grassy slopes at elevations of 3400 - 4300 metres in Tibet[266].

propta Seed - best sown in autumn in a shaded cold frame[200]. The seed can also be sown in spring in a cold frame. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse or cold frame for their first winter, planting them out in the spring. Division in early spring or autumn[1, 111]. Divide up the rootstock with a sharp spade or knife, making sure that there is at least one growth bud on each division. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Prefers a deep, fertile, moderately heavy, humus rich, moisture retentive, well-drained soil in sun or semi-shade[200]. Grows well in heavy clay soils. Plants can be grown in quite coarse grass, which can be cut annually in the autumn[233]. Hardy to about -20°c[200]. Plants in this genus seem to be immune to the predations of rabbits[233]. Hybridizes freely with other members of this genus[200]. The root is sold for medicinal purposes in local markets in the Himalayas[46, 61]. Overgathering of this plant from the wild, both for food and for medicine, is becoming a cause of conservation concern[272]. The plant is heat tolerant in zones 8 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2].

6.2.124 Berberis lycium

5 tlin 9 cyuc 3 kcaak 1 tcan 3 dwat 3 m hkuc
hmimhtut cyutli kyuctup hwicli hyishrasjltutnyikfrip hpa7tli flatprikliw hpa7tmwatli fyfixre7t hjonli

drutta Berberis lycium is an evergreen Shrub growing to 3 m (9ft 10in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf all year, in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kckaKa Edible Parts: Fruit LeavesEdible Uses: TeaFruit-raw or cooked and made into preserves[2, 11, 105, 177, 183]. Fairly juicy with a nice slightly acid flavour[K]. The fruits are about 8mm long[200]. Leaves and young shoots - cooked[2, 177, 183]. Leaves are a tea substitute[177, 183].

tcanta DyeA yellow dye is obtained from the root.
dwatta Antibacterial Aperient Cancer Carminative Dysentery Febrifuge OphthalmicThe roots are aperient, carminative, febrifuge and ophthalmic[11, 46, 61, 158, 240]. They are used in the treatment of eye complaints, menorrhagia, chronic diarrhoea and piles[240]. The leaves have been used in the treatment of jaundice[240]. Berberine, universally present in rhizomes of Berberis species, has marked antibacterial effects. Since it is not appreciably absorbed by the

6.2.105 Amelanchier weigandii

5 tlin 9 cyuc 3 kcaak 0 tcan 0 dwat 5 m hkuc
hmimhtut cyutli tcup hwicli hrasjltutnyikfrip hpa7tli flatprikliw hpa7tmwatli fyfixre7t hjonli

drutta Amelanchier weigandii is a deciduous Shrub growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kckaKa Edible Parts: FruitEdible Uses: Fruit, raw or cooked. The fruit is rich in iron and copper[226].

nrakta Eastern N. America - Canada. ksacta Not known
propta Seed - it is best harvested 'green', when the seed is fully formed but before the seed coat has hardened, and then sown immediately in pots outdoors or in a cold frame. If stored seed is obtained early enough in the autumn, it can be given 4 weeks warm stratification before being left out in the winter and it should then germinate in the spring. Otherwise seed can be very slow to germinate, perhaps taking 18 months or more. When large enough to handle, prick the seedlings out into individual pots and grow them on in a sheltered outdoor position, planting them out once they are 20cm or more tall. If there is sufficient seed it is best to sow it thinly in an outdoor seedbed[78, 80]. Grow the seedlings on for two years in the seedbed before planting them out into their permanent positions during the winter. Layering in spring - takes 18 months[78]. Division of suckers in late winter. The suckers need to have been growing for 2 years before you dig them up, otherwise they will not have formed roots. They can be planted out straight into their permanent positions if required.

nwatta We have very little information on this species, though it is growing well at Kew Botanical Gardens, where 8 year old plants are about 3 metres tall with multiple stems and lots of side branches[K]. They were flowering well at the end of April 1995[K]. The following notes are based on the general needs of the genus. Prefers a rich loamy soil in a sunny position or semi-shade[1, 200] but thrives in any soil that is not too dry or water-logged[11]. Grows well in heavy clay soils. All members of this genus have edible fruits and, whilst this is dry and uninteresting in some species, in many others it is sweet and juicy. Many of the species have potential for use in the garden as edible ornamentals. The main draw-back to this genus is that birds adore the fruit and will often completely strip a tree before it is fully ripe[K]. Hybridizes freely with other members of this genus[200]. Grafting onto seedlings of *A. lamarckii* or *Sorbus aucuparia* is sometimes practised in order to avoid the potential problem of hybridizing[1].

6.2.106 Crataegomespilus dardarii

Bronvaux Medlar
5 tlin 9 cyuc 3 kcaak 0 tcan 0 dwat 5 m hkuc
hmimhtut cyutli tcup hwicli hrasjltutnyik hpa7tli flatprikliw hpa7tmwatli xre7t hjonli

drutta Crataegomespilus dardarii is a deciduous Tree growing to 5 m (16ft) by 3.5 m (11ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in May. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kckaKa Edible Parts: FruitEdible Uses: Fruit - raw or cooked. There are three distinct sizes of fruit on this tree, though they all have the same flavour[K]. The first is quite large, up to 35mm in diameter, and is just like the medlar, *Mespilus germanica*. The second is slightly smaller, perhaps 25mm in diameter, and once more like a medlar. The third is rather smaller, perhaps 10mm in diameter, and is intermediate between the medlar and the hawthorn, *Crataegus* spp. The fruit does not ripen until very late in the autumn, or even early winter. It will probably need to be harvested before it

is fully ripe and stored in a cool but frost-free place where it can continue the ripening process. It is ready to eat when the flesh has turned brown and is very soft. It will then have a delicious, sweet flavour that reminds you of a lush tropical fruit. Care must be taken that the fruit is eaten no later than this stage because it is almost at the point of rotting and will then cause gastric upsets[K].

nrakta A graft hybrid of garden origin. ksacta Not known in the wild

propta Seed - this species is a bi-generic graft hybrid and is very unlikely to breed true from seed. Should you want to give it a try, then the seed is best sown as soon as it is ripe in the autumn in a cold frame. Some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be stratified for 3 months at 15°c and then for another 3 months at 4°c[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years. Grafting onto a rootstock of hawthorn, *Crataegus* species.

nwatta Prefers a well-drained, moisture-retentive soil enriched with organic matter, in sun or part shade[200]. Plants are hardy to about -15°c[200]. This tree is a bi-generic graft chimera resulting from a medlar, *Mespilus germanica*, being grafted on a hawthorn, *Crataegus* sp.[111]. Three branches that grew from just beneath the graft were different from each other and also from either of the two species used in the graft. They showed characteristics intermediate between the hawthorn and the medlar[11]. These three forms have been propagated and, in growth, each form tends to produce some branches of the other forms[11]. The first branch that was propagated has received specific status as *C. dardarii*. This is closer to the medlar than the hawthorn, but produces its flowers in clusters like the hawthorn - the fruits are medlar-like but a bit smaller. This tree also produces some branches that are pure medlar[11]. The second branch has cultivar status as 'Jules d'Asnières'. This is more hawthorn-like, and produces some hawthorn-like spines. It produces fruit that is more hawthorn in size[11]. The third branch, which does not seem to have been named, started off like a pure hawthorn, but towards its extremity changed into the cultivar 'Jules d'Asnières'[11].

6.2.107 Zanthoxylum alatum

Winged Prickly Ash
5 tlin 9 cyuc 3 kcaak 3 tcan 2 dwat 4 m hkuc
hmimhtut cyutli tcup hwicli hrasjltutnyik hpa7tli flatprikliw hpa7tmwatli nyanhjen hjonli

drutta Zanthoxylum alatum is a deciduous Shrub growing to 4 m (13ft 1in). See above for USDA hardiness. It is hardy to UK zone 6. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). . The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kckaKa Edible Parts: Edible Uses: CondimentThe seed is ground into a powder and used as a condiment[183]. A pepper substitute, it is widely used in the Orient[105, 132, 158, 183]. A light roasting brings out more of the flavour[206]. The seed is an ingredient of the famous Chinese 'five spice' mixture[206]. The fruit is rather small but is produced in clusters which makes harvesting easy[K]. Each fruit contains

a single seed. Young leaves are used as a condiment[105, 158, 183].

tcanta Miscellany Teeth WoodThe fruit contains 1.5% essential oil[240]. The fruit is used to purify water[146, 158]. Toothbrushes are made from the branches[146, 158]. Wood - heavy, hard, close grained. Used for walking sticks[146, 158].

dwatta Cholera Miscellany Odontalgic Stimulant Stomachic TonicThe seeds and the bark are used as an aromatic tonic in the treatment of fevers, dyspepsia and cholera[240]. The fruits, branches and thorns are considered to be carminative and stomachic[46, 61, 146, 158, 240]. They are used as a remedy for toothache[240].

nrakta E. Asia - China to the Himalayas. ksacta Forest undergrowth and hot valleys to 1800 metres in the Himalayas.

propta Seed - best sown in a greenhouse as soon as it is ripe in the autumn. Stored seed may requires up to 3 months cold stratification, though scarification may also help[113]. Sow stored seed in a cold frame as early in the year as possible. Germination should take place in late spring, though it might take another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant them out in early summer. Cuttings of half-ripe wood, July/August in a frame. Root cuttings, 3cm long, planted horizontally in pots in a greenhouse. Good percentage[78]. Suckers, removed in late winter and planted into their permanent positions[113].

nwatta Prefers a good deep well-drained moisture retentive soil in full sun or semi-shade[1, 11, 200]. This species is closely related to *Z. planispinum*[200]. Flowers are formed on the old wood[206]. Dioecious. Male and female plants must be grown if seed is required.

6.2.108 Pleioblastus simonii

Medake, Simon bamboo

5 tlin 9 cyuc 3 kcaak 4 tcan 0 dwat 4.5 m hkuc hmimhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikliws hpa7tmwatli xre7t hjonli

drutta Pleioblastus simonii is an evergreen Bamboo growing to 4.5 m (14ft 9in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Seed Shoots StemEdible Uses: Young shoots - cooked[25, 61, 105]. They have a very bitter flavour, this bitterness is considerably reduced by changing the water at least once during the cooking process - though this will also remove quite a few of the nutrients[K]. The new shoots are about 20mm in diameter[K]. Seed cooked. As a grass seed the paper husk must be removed before eating.

tcanta Hedge Hedge Plant support WoodCanes are thin walled but extremely strong, they can be used as plant supports, also for fencing etc[25, 61, 74, 195]. Often used in China for making fan handles, poles and in various handicrafts[195]. Tolerant of maritime exposure and very hardy and vigorous, this plant makes a good screen or hedge[25, 166, 195].

nrakta E. Asia - China, Japan. Locally naturalized in Britain[50]. ksacta Not known

propta Seed - if possible, surface sow the seed as soon as it is ripe in a greenhouse at about 20°C. Stored seed should be sown as soon as it is received. Do not allow the compost to dry out. Germination usually takes place fairly quickly so long as the seed is of good quality, though it can take 3 - 6 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a lightly shaded place in the greenhouse or cold frame until they are large enough to plant out, which could be a number of years. The plants only flower at intervals of several years and so seed is rarely available. Division in spring as new growth commences. Very easy, single canes can be used. Pot them up in light shade in a greenhouse. Make sure the foliage is not allowed to dry out - misting 2 - 3 times a day for the first

couple of weeks following division can be very helpful. Plant out in the summer once they are growing away strongly.

nwatta A very easily grown bamboo, it succeeds in most soils but prefers a good loamy soil in sun or semi-shade[1]. Dislikes drought[1]. Tolerates maritime exposure[166]. A very hardy plant, it can tolerate temperatures down to between -20 and -25°C. The rootstock is running and very invasive[11, 25, 166]. Another report says that it is a vigorous grower but not invasive[195]. New shoots are produced from May[25]. The canes are harvested commercially for their many uses in Japan[195]. It is the third most commonly cultivated species in Japan[195]. This species is notably resistant to honey fungus[200]. Unlike many bamboos, this plant quite often flowers and sets viable seed, the plants do not usually die as a result of this[122]. However, if they are fed with artificial NPK fertilizers at this time they are far less likely to survive[122].

6.2.109 Zanthoxylum simulans

Szechuan Pepper, Chinese-pepper, Prickly Ash

5 tlin 8 cyuc 3 kcaak 0 tcan 2 dwat 4 m hkuc pcmhmmhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikliws hpa7tmwatli nyanhjen hjonli

drutta Zanthoxylum simulans is a deciduous Shrub growing to 4 m (13ft) by 6 m (19ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in June, and the seeds ripen in October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Edible Uses: CondimentThe fruit is dried and used as a condiment[46, 61, 105, 177]. A pepper flavour, it is stronger and more pungent than black pepper[183]. It can be used whole or ground into a powder and used as a table seasoning[183]. A light roasting brings out more of the flavour[206]. It is an ingredient of the famous Chinese 'five spice' mixture[206].

dwatta Anodyne Anthelmintic Antidote Antiphlogistic Astringent Carminative Diaphoretic Digestive Diuretic Emmenagogue Stimulant Stomachic Tonic VasodilatorAstringent, diaphoretic, emmenagogue[116, 178]. The pericarp is anaesthetic, diuretic, parasiticidal and vasodilator[176]. It is used in the treatment of gastralgia and dyspepsia due to cold with vomiting, diarrhoea, abdominal pain, ascariasis and dermal diseases[176]. It has a local anaesthetic action and is parasiticide against the pork tapeworm (*Taenia solium*)[176]. The pericarp contains geraniol. In small doses this has a mild diuretic action, though large doses will inhibit the excretion of urine[176]. There is a persistent increase in peristalsis at low concentration, but inhibition at high concentration[176]. The leaves are carminative, stimulant and sudorific[147, 218]. The fruit is carminative, diuretic, stimulant, stomachic and tonic[147, 218]. The seed is antiphlogistic and diuretic[218]. A decoction of the root is digestive and also used in the treatment of snakebites[218]. The resin contained in the bark, and especially in that of the roots, is powerfully stimulant and tonic[82].

nrakta E. Asia - China. ksacta Virgin wilds, hillsides and open woods[147].

propta Seed - best sown in a greenhouse as soon as it is ripe in the autumn. Stored seed may requires up to 3 months cold stratification, though scarification may also help[113]. Sow stored seed in a cold frame as early in the year as possible. Germination should take place in late spring, though it might take another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant them out in early summer. Cuttings of half-ripe wood, July/August in a frame. Root cuttings, 3cm long, planted horizontally in pots in a greenhouse. Good percentage[78]. Suckers, removed in late winter and planted into their permanent positions[113].

nwatta Landscape Uses:Border, Massing. Easily grown in loamy soils in most positions, but prefers a good deep well-drained moisture retentive soil in full sun or semi-shade[1,

Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame[78]. Cuttings of mature wood of the current season's growth 15 - 20cm with a heel, late autumn in a frame or a sheltered outdoor bed[78].

nwatta Tolerates most soils, including chalk[200], but prefers a moist loamy soil[11, 200]. Grows well in heavy clay soils. Tolerates some shade but is best in a sunny position[1]. Tolerates atmospheric pollution and coastal situations[200]. Plants in this genus are notably resistant to honey fungus[200].

6.2.120 Rubus kuntzeanus

5 tlin 9 cyuc 3 kcaak 1 tcan 0 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikliws hpa7tmwatli xre7t hjonli

drutta Rubus kuntzeanus is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in August, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105]. A good flavour[11, 177]. The orange-red fruit is about 20mm in diameter[200].

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

nrakta E. Asia - W and C. China. ksacta Slopes, roadsides and thickets at elevations of 800 - 2000 metres[266].

propta Seed - requires stratification and is best sown in early autumn in a cold frame. Stored seed requires one month stratification at about 3°C and is best sown as early as possible in the year. Prick out the seedlings when they are large enough to handle and grow on in a cold frame. Plant them out into their permanent positions in late spring of the following year. Division in early spring or just before leaf-fall in the autumn[200].

nwatta Easily grown in a good well-drained loamy soil in sun or semi-shade[1, 11, 200]. Closely related to *R. inominatus*[11, 105]. This species is a raspberry with biennial stems, it produces a number of new stems each year from the perennial rootstock, these stems fruit in their second year and then die[200]. The stems have very few prickles[200]. Plants in this genus are notably susceptible to honey fungus[200].

6.2.121 Viburnum foetens

5 tlin 9 cyuc 3 kcaak 3 tcan 0 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikliws hpa7tmwatli dyatxre7t hjonli

drutta Viburnum foetens is a deciduous Shrub growing to 3 m (9ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from January to March. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 105, 145, 146]. A sweetish flavour[2], but the fruit is not freely borne in Britain[K].

tcanta WoodWood - hard, close grained[146].

nrakta E. Asia - Himalayas. ksacta An undershrub of coniferous forests, it is also found in oak forests from 1500 - 3300 metres[51, 146].

propta Seed - best sown in a cold frame as soon as it is ripe. Germination can be slow, sometimes taking more than 18 months. If the seed is harvested 'green' (when it has fully developed but before it has fully ripened) and sown immediately in a cold frame, it should germinate in the spring[80]. Stored seed will require 2 months warm then 3 months cold stratification and can still take 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame or greenhouse. Plant out into their permanent positions in

late spring or early summer of the following year. Cuttings of soft-wood, early summer in a frame[200]. Pot up into individual pots once they start to root and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, 5 - 8 cm long with a heel if possible, July/August in a frame[78, 113]. Plant them into individual pots as soon as they start to root. These cuttings can be difficult to overwinter, it is best to keep them in a greenhouse or cold frame until the following spring before planting them out[113]. Cuttings of mature wood, winter in a frame. They should root in early spring - pot them up when large enough to handle and plant them out in the summer if sufficient new growth is made, otherwise keep them in a cold frame for the next winter and then plant them out in the spring. Layering of current seasons growth in July/August. Takes 15 months[78].

nwatta An easily grown plant, it succeeds in most soils but is ill-adapted for poor soils and for dry situations[1]. It prefers a deep rich loamy soil in sun or semi-shade[11, 200]. Best if given shade from the early morning sun in spring[200]. Requires shelter from northerly and easterly winds[200]. Plants are hardy to about -20°C[184]. A very ornamental plant[1], it flowers in the winter and the flowers are said to withstand temperatures down to -12°C without damage[11, 200]. However fruit is not often produced in this country[K]. This may be due to the plant being self-incompatible and so growing 2 or more different cultivars together may improve fruit set[11, 200]. Hand pollination may also be beneficial as well as siting the plants so that they get the maximum of protection from severe winter weather[K]. A west-facing wall or woodland edge would be ideal for this[K]. Closely allied to *V. grandiflorum* and included in that species by many botanists[11]. This species has a more westerly range, shorter stems and white flowers[200].The crushed leaves have a foetid aroma[182].

6.2.122 Viburnum farreri

Culver's root, Fragrant Viburnum

5 tlin 8 cyuc 3 kcaak 0 tcan 0 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikliws hpa7tmwatli dyatxre7t hjonli

drutta Viburnum farreri is a deciduous Shrub growing to 3 m (9ft) by 2.5 m (8ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from November to February, and the seeds ripen in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[11]. A sweet flavour, but the fruit is not freely borne in Britain[K].

nrakta E. Asia - China in Gansu. ksacta Not known

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

vermifuge whilst the fruits are used as a vermifuge for children[218].

nrakta E. Asia - China, Japan. ksacta Thickets in hills and at low elevations in mountains in Japan[58].

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

nwatta Landscape Uses:Border, Massing, Screen, Specimen. An easily grown plant, it succeeds in most soils but is ill-adapted for poor soils and for dry situations[1]. It prefers a deep rich loamy soil in sun or semi-shade[11, 200]. Best if given shade from the early morning sun in spring[200]. Plants are self-incompatible and need to grow close to a genetically distinct plant in the same species in order to produce fruit and fertile seed[11, 200]. A very ornamental[1] and polymorphic species[58], there are some named varieties developed for the ornamental value of the fruit[182]. Special Features:Attractive foliage, Not North American native, Fragrant flowers, Attractive flowers or blooms.

6.2.118 Zanthoxylum planispinum

Winged Prickly Ash

5 tin 9 cyuc 3 kcaak 0 tcan 2 dwat 3.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli nyanhjen hjonli

drutta Zanthoxylum planispinum is a deciduous Shrub growing to 3.5 m (11ft 6in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in May, and the seeds ripen in October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). . The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: CondimentSeed - cooked. It can be ground into a powder and used as a condiment[183], a pepper substitute[2, 46, 177]. A light roasting brings out more of the flavour[206]. The seed is an ingredient of the famous Chinese 'five spice' mixture[206]. The peel is also used[105]. Young leaves are eaten[105, 177, 183]. No further details are given.

dwatta Stimulant Stomachic Tonic VermifugeThe seeds and roots are stomachic and vermifuge[46, 61, 147]. A decoction of 7 - 14 seeds is used in the treatment of abscesses, arthritis, bruises, gastritis, swellings etc[218]. The resin contained in the bark, and especially in that of the roots, is powerfully stimulant and tonic[82].

nrakta E. Asia - China, Japan, Korea. ksacta Low mountains in Japan[58].

propta Seed - best sown in a greenhouse as soon as it is ripe in the autumn. Stored seed may require up to 3 months cold stratification, though scarification may also help[113]. Sow stored seed in a cold frame as early in the year as possible. Germination should take place in late spring, though it might take another 12 months. Prick out the seedlings into

individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant them out in early summer. Cuttings of half-ripe wood, July/August in a frame. Root cuttings, 3cm long, planted horizontally in pots in a greenhouse. Good percentage[78]. Suckers, removed in late winter and planted into their permanent positions[113].

nwatta Prefers a good deep well-drained moisture retentive soil in full sun or semi-shade[1, 11, 200]. A very ornamental plant[1], it is usually hardy in most parts of Britain but can be damaged in severe winters[11]. Fruits are freely produced after a hot summer[11]. The flowers are formed on the old wood[206]. Dioecious. Male and female plants must be grown if seed is required. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

6.2.119 Sambucus racemosa var. racemosa

Red Coast Elder

5 tin 9 cyuc 3 kcaak 2 tcan 2 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Sambucus racemosa var. racemosa is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to July, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

pista Although no specific mention has been seen for this species, the leaves and stems of some members of this genus are poisonous[9, 76]. The fruit of many species (although no records have been seen for this species) has been known to cause stomach upsets to some people. Any toxin the fruit might contain is liable to be of very low toxicity and is destroyed when the fruit is cooked[65, 76].

kcakta Fruit - raw or cooked[61, 105, 257]. The fruit can be made into jams and preserves[257]. It can also be dried for winter use[118]. The fruit is about 5mm in diameter and is borne in large clusters[200]. Some caution is advised, see notes above on toxicity. Flowers - raw or cooked.

dwatta The leaves are abortifacient, analgesic, oxytotic and poultice[257]. A decoction of the leaves has been used to terminate a pregnancy and can also be taken during labour to ease the birth[257]. An infusion of the leaves has been used as an antiseptic wash on areas affected by blood poisoning[257]. A poultice of the pounded leaves has been applied to abscess and boils and also to sore joints to help reduce the swelling[257]. A poultice of the cooked shoots has been used to alleviate pain[257]. The bark is cathartic[257]. An infusion of the bark has been used in the treatment of coughs and colds[257]. A poultice of the bark has been applied to sore joints to help reduce the swelling[257]. The fruit has been cooked and eaten as a treatment for stomach problems[257].

nrakta Western N. America - Alaska to California. ksacta River banks in low moist soils from sea-level to 2400 metres[82].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame, when it should germinate in early spring. Stored seed can be sown in the spring in a cold frame but will probably germinate better if it is given 2 months warm followed by 2 months cold stratification first[78, 98, 113]. Prick out the seedlings into individual pots when they are large enough to handle. If good growth is made, the young plants can be placed in their permanent positions during the early summer. Otherwise, either put them in a sheltered nursery bed, or keep them in their pots in a sheltered position and plant them out in spring of the following year.

11, 200]. A plant has been growing well for many years in deep woodland shade at Cambridge Botanical gardens, it was fruiting heavily in autumn 1996[K]. Cultivated for its seed, which is used as a condiment in China[46, 61]. Flowers are formed on the old wood[206]. The bruised leaves are strongly aromatic[245]. Dioecious. Male and female plants must be grown if seed is required. Special Features:Inconspicuous flowers or blooms, Blooms appear periodically throughout the year.

6.2.110 Viburnum nudum

Smooth Withe Rod, Possumhaw, Withe-rod, Swamp Haw, Smooth Witherod, Possum Haw Viburnum, Possum Haw 5 tin 9 cyuc 3 kcaak 0 tcan 1 dwat 4.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatprikliwis hpa7tmwatli dyatxre7t hjonli

drutta Viburnum nudum is a deciduous Shrub growing to 4.5 m (14ft 9in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in June, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[3, 105]. It usually has a sweetish flavour[2, 183] but is sometimes bitter[43] and is usually unpalatable[227]. The ovoid fruit is about 8mm long and contains a single large seed[200].

dwatta Antispasmodic Diuretic TonicA tea made from the bark is antispasmodic, diuretic, tonic and uterine sedative[222].

nrakta Eastern N. America - Maryland to Florida, west to Arkansas and Kentucky. ksacta Wooded swamps, wet pinelands and bogs[43]. Also found on rich hillsides[82].

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

nwatta Landscape Uses:Screen, Specimen. An easily grown plant, it succeeds in most soils but is ill-adapted for poor soils and for dry situations[1]. It prefers a deep rich loamy soil in sun or semi-shade[11, 200]. Best if given shade from the early morning sun in spring[200]. Plants often grow in quite acid soils in the wild[227]. Plants are self-incompatible and need to grow close to a genetically distinct plant in the same species in order to produce fruit and fertile seed[11, 200]. This species is closely related to *V. cassinoides*[11]. Special Features: Attracts birds, North American native, Wetlands plant, Fragrant flowers, Attractive flowers or blooms.

6.2.111 Staphylea pinnata

Bladder Nut

5 tin 9 cyuc 3 kcaak 0 tcan 0 dwat 4.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Staphylea pinnata is a deciduous Shrub growing to 4.5 m (14ft) by 4.5 m (14ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to June, and the seeds ripen from September to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: SeedEdible Uses: Seed - raw[2, 105, 177]. Said to taste like pistachios, the seeds are eaten by children in Germany[183].

nrakta Europe. Naturalized in Britain[17]. ksacta Hedgerows and copses[11, 17].

propta Seed - this can be very slow to germinate, sometimes taking 18 months or more. It is best sown as soon as it is ripe in a cold frame[200], and some of it at least should then germinate in the spring. Stored seed should be sown as early in the year as possible and given cold stratification - it might not germinate until spring of the following year. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in the greenhouse for their first winter. Plant them out early the following summer. Cuttings of half-ripe wood, 5 - 8cm with a heel, July/August in a frame. Fair to good percentage[78]. Layering in July/August. Takes 15 months. Good percentage[78]. Plants sometimes produce suckers, these can be removed in the dormant season and planted out.

nwatta Tolerant of a wide range of soils so long as they are not too dry[11, 182, 200], it prefers a rich loamy soil in full sun or semi-shade[200]. Prefers a neutral to acid soil but tolerates some alkalinity[202]. A very ornamental plant[1], it is hardy to about -20°C[184]. The plants flower best in years that follow hot summers[200]. Plants in this genus are notably resistant to honey fungus[200].

6.2.112 Quercus coccifera

Kermes Oak

5 tin 9 cyuc 3 kcaak 3 tcan 2 dwat 4 m hkuc hmimhtut cyutli tcup hwicli jlutnyik hpa7tli flatprikliwis hpa7tmwatli hjonli

drutta Quercus coccifera is an evergreen Shrub growing to 4 m (13ft) by 4 m (13ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from April to June. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: CoffeeSeed - cooked[2, 63, 105]. It can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed contains bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute.

tcanta Dye Repellent Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. Oak galls are ex-rescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves,

the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. The bark is rich in tannin[148]. A black dye can be obtained from the bark[89] and also from the seeds[148].

dwatta Astringent DysenteryAny galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta Europe - Mediterranean. ksacta Dry places on limestone and siliceous rocks[89].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Lime tolerant[188]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. A very ornamental plant[1], it thrives in Britain[200]. A shrub growing in dappled woodland shade at Cambridge Botanical Gardens produced a few ripe seeds after the hot summer of 1989, though the vast majority of seeds were aborted[K]. The fruit ripens in its second year[11]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. Any transplanting should be done once growth has commenced in late May or in September[11]. Hybridizes freely with other members of the genus[200]. This species is notably resistant to honey fungus[88, 200].

6.2.113 Prunus angustifolia

Chickasaw Plum, Watson's plum, Hally Jolivet Cherry
5 tlin 9 cyuc 3 kcaak 3 tcan 1 dwat 3 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Prunus angustifolia is a deciduous Tree growing to 3 m (9ft 10in) at a medium rate. See above for USDA hardness. It is hardy to UK zone 6. It is in flower in April, and the seeds ripen from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: Fruit SeedEdible Uses: Fruit - raw, cooked or dried for later use[82, 149, 274]. Large and thin-skinned with a soft juicy sweet pulp, it has a delicious flavour and is very good eaten out of hand, whilst it can also be used in pies, preserves etc[183, 274]. The fruit is up to 18mm in diameter[227]. Seed - raw or cooked. Do not eat the seed if it is too bitter - see the notes above on toxicity.

tcanta Dye Shelterbelt Soil stabilization WoodA green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168]. This species is sometimes used in shelterbelt planting[227]. It has an extensive root system and often forms thickets, which make it useful for erosion control[229]. Wood - heavy, rather soft, not strong[82]. It weighs 43lb per cubic foot[227] and is of little commercial value[229].

dwatta Although no specific mention has been seen for this species, all members of the genus contain amygdalin and

prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta South-eastern N. America - New York to Florida, west to Texas. ksacta Usually found in sandy soils, occurring along fence rows, in pastures, fields, stream banks, sand dunes and disturbed sites, often forming thickets[229].

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200]. Softwood cuttings from strongly growing plants in spring to early summer in a frame[200]. Layering in spring.

nwatta Landscape Uses:Border, Espalier, Standard, Specimen. Thrives in a well-drained moisture-retentive loamy soil[11, 200]. Prefers some lime in the soil but is likely to become chlorotic if too much lime is present[1]. Succeeds in sun or partial shade though it fruits better in a sunny position[11, 200]. Although it should be hardy in all parts of Britain, it grows better in the warmer areas of the country[11]. A fast-growing but short-lived tree in the wild[229], it has become rather rare in a truly wild state[227], though it is often cultivated for its edible fruit in N. America. There are some named varieties[82, 183]. The fruit is not freely produced in British gardens[11]. The flowers, which appear just before the leaves unfold, have a refreshing fruity scent[245]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. This species suckers freely in the wild, often forming thickets[82]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features: North American native, All or parts of this plant are poisonous, Attracts butterflies, Fragrant flowers, Blooms are very showy. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A clumping plant, forming a colony from shoots away from the crown but with a limited spread [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

6.2.114 Ribes altissimum

5 tlin 9 cyuc 3 kcaak 0 tcan 0 dwat 3 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Ribes altissimum is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardness. It is hardy to UK zone 6 and is not frost tender. It is in flower in May, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. Small with a thick skin and a pleasant acid taste[74]. The fruit is abundantly produced in the wild[74]. The purplish-black fruit is about 7mm in diameter[266].

nrakta E. Asia - N. China, Mongolia, Siberia. ksacta Taluses composed of large stones in the forest zone, often into the bald mountain zone[74]. Coniferous or mixed forests and forest margins on mountain slopes below 2000 metres in N. China[266].

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

a heel of the previous year's growth, November to February in a cold frame or sheltered bed outdoors[78, 200].

nwatta Easily grown in a moisture retentive but well-drained loamy soil of at least moderate quality[11, 200]. Does well in shade though does not fruit so well in such a position[11]. Hardy to about -20°C[200]. Plants can harbour a stage of white pine blister rust, so should not be grown in the vicinity of pine trees[155]. Plants in this genus are notably susceptible to honey fungus[200]. This plant is possibly useful as part of a breeding programme for red currants[74].

6.2.115 Viburnum cotinifolium

5 tlin 9 cyuc 3 kcaak 3 tcan 0 dwat 3.5 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwisli hpa7tmwatli dyatxre7t hjonli

drutta Viburnum cotinifolium is a deciduous Shrub growing to 3.5 m (11ft 6in). See above for USDA hardness. It is hardy to UK zone 6. It is in flower in June, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 51, 146, 158]. A sweetish flavour[183]. The ovoid fruit is about 12mm long and contains a single large seed[200].

tcanta WoodWood - hard, close grained[146, 158]. nrakta E. Asia - Himalayas. ksacta Amongst oak and decidor in forests and shrubberies, affecting open spaces on the rather drier exposures, to 3600 metres[51, 146].

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

nwatta An easily grown plant, it succeeds in most soils but is il-adapted for poor soils and for dry situations[1]. It prefers a deep rich loamy soil in sun or semi-shade[11, 200]. Best if given shade from the early morning sun in spring[200]. Hardy to about -15°C[184]. Plants are self-incompatible and need to grow close to a genetically distinct plant in the same species in order to produce fruit and fertile seed[11, 200]. Closely allied to *V. lantana*[1, 11], but not as hardy as that species[11].

6.2.116 Prunus canescens

Greyleaf Cherry
5 tlin 9 cyuc 3 kcaak 2 tcan 1 dwat 3 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Prunus canescens is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardness. It is hardy to UK zone 6. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is

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

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: Fruit SeedEdible Uses: Fruit - raw or cooked[183]. A pleasant cherry-like flavour[11]. The fruit is about 10mm in diameter and contains one large seed[200]. Seed - raw or cooked. Do not eat the seed if it is too bitter - see the notes above on toxicity.

tcanta Dye RootstockUsed as a rootstock for cherries. It is compatible with most sweet cherry cultivars and produces small trees with an open growth habit. Suitable for planting at 300 - 500 trees per hectare. The fruit yield tends to be very good[183]. A green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168].

dwatta Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta E. Asia - W. China. ksacta Cliffs[109]. propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200]. Softwood cuttings from strongly growing plants in spring to early summer in a frame[200]. Layering in spring.

nwatta Thrives in a well-drained moisture-retentive loamy soil, growing well on limestone[11, 200]. Prefers some lime in the soil but is likely to become chlorotic if too much lime is present[1]. Succeeds in sun or partial shade though it fruits better in a sunny position[11, 200]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. Plants in this genus are notably susceptible to honey fungus[200].

6.2.117 Viburnum dilatatum

Linden Viburnum, Linden arrowwood
5 tlin 8 cyuc 3 kcaak 2 tcan 1 dwat 3 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli dyatxre7t hjonli

drutta Viburnum dilatatum is a deciduous Shrub growing to 3 m (9ft) by 2 m (6ft) at a medium rate. See above for USDA hardness. It is hardy to UK zone 5. It is in flower in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit - raw or cooked[105, 177, 179]. A sweet flavour[178]. The ovoid fruit is about 8mm long and contains a single large seed[200]. Leaves - cooked[105, 177].

tcanta FibreA fibre obtained from the inner bark is used for making ropes[178].

dwatta Anthelmintic Astringent VulneraryA decoction of the leaves is astringent and vermifuge. It is used for washing and healing maggoty sores[178, 218]. The twigs are also

nrakta E. Asia - China to the Himalayas and Sri Lanka. ksacta Forests and shrubberies, 1500 - 3300 metres, from Uttar Pradesh to S.W. China[51, 146].

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

nwatta An easily grown plant, it succeeds in most soils but is ill-adapted for poor soils and for dry situations[1]. It prefers a deep rich loamy soil in sun or semi-shade[11, 200]. Best if given shade from the early morning sun in spring[200]. Not all forms of this species are hardy in Britain[11]. Plants are self-incompatible and need to grow close to a genetically distinct plant in the same species in order to produce fruit and fertile seed[11, 200]. A polymorphic species[11]. This form of *V. erubescens* fruits freely in Britain[200].

6.2.227 Amelanchier ovalis

Snowy Mespilus, Dwarf Garden Serviceberry

5 tlin 7 cyuc 2 kcaak 0 tcan 0 dwat 5 m hkuc htut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta Amelanchier ovalis is a deciduous Shrub growing to 5 m (16ft 5in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Edible fruit - raw or cooked. Not very palatable, but it can be used for preserves etc[183]. The fruit is rich in iron and copper[226].

tcanta WoodWood - fine grained, hard, very heavy, red-dish. Used for small articles[74].

nrakta C. and S. Europe ksacta Rocky places and stony woods[45], mainly on limestone[50, 184].

propta Seed - it is best harvested 'green', when the seed is fully formed but before the seed coat has hardened, and then sown immediately in pots outdoors or in a cold frame. If stored seed is obtained early enough in the autumn, it can be given 4 weeks warm stratification before being left out in the winter and it should then germinate in the spring. Otherwise seed can be very slow to germinate, perhaps taking 18 months or more. When large enough to handle, prick the seedlings out into individual pots and grow them on in a sheltered outdoor position, planting them out once they are 20cm or more tall. If there is sufficient seed it is best to sow it thinly in an outdoor seedbed[78, 80]. Grow the seedlings on for two years in the seedbed before planting them out into their permanent positions during the winter. Layering in spring - takes 18 months[78]. Division of suckers in late winter. The suckers need to have been growing for 2 years before you dig them up, otherwise they will not have formed roots. They can

be planted out straight into their permanent positions if required.

nwatta Prefers a rich loamy soil in a sunny position or semi-shade[1, 200] but thrives in any soil that is not too dry or water-logged[11]. Grows well in heavy clay soils. Fairly lime tolerant[200]. Hardy to about -20°C[184]. All members of this genus have edible fruits and, whilst this is dry and uninteresting in some species, in many others it is sweet and juicy. Many of the species have potential for use in the garden as edible ornamentals. The main draw-back to this genus is that birds adore the fruit and will often completely strip a tree before it is fully ripe[K]. A very ornamental plant[74]. Hybridizes freely with other members of this genus[200]. Grafting onto seedlings of A. lamarckii or Sorbus aucuparia is sometimes practised in order to avoid the potential problem of hybridizing[1]. Special Features:Not North American native, Blooms are very showy.

6.2.228 Malus glabrata

5 tlin 9 cyuc 2 kcaak 0 tcan 0 dwat 5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Malus glabrata is a deciduous Tree growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177]. Up to 3cm in diameter[200].

nrakta N. America - Western N. Carolina. ksacta Valleys, 600 - 900 metres[82]

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

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[1, 200]. The fruit is a good wildlife food source, especially for birds[200]. This species is closely related to *M. glaucescens*[200]. It hybridizes freely with other members of the genus[200]. Plants in this genus are notably susceptible to honey fungus[200].

6.2.229 Viburnum erubescens

5 tlin 9 cyuc 2 kcaak 0 tcan 1 dwat 5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Viburnum erubescens is a deciduous Shrub growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in July, and the seeds ripen in October. The species is hermaphrodite (has both

6.2.153 Chaerophyllum bulbosum

Turnip-Rooted Chervil

5 tlin 9 cyuc 3 kcaak 0 tcan 0 dwat 1.2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta Chaerophyllum bulbosum is a BIENNIAL growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 6. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista One report suggests that the leaves and roots are poisonous[1]. The same report says that this plant is cultivated for its edible root! The root is unlikely to be poisonous[K].

kcakta Edible Parts: Root StemEdible Uses: Root - raw or cooked[2, 33, 34, 37, K]. The raw root is rather tough, but has a nice, aromatic, starchy flavour[K]. When cooked it becomes floury and sweet[27] with a peculiar flavour that is excellent and unlike any other vegetable[183]. Peeling the roots ruins the flavour[183]. The root is about the size of a small carrot[2]. It can be harvested when the foliage dies down, usually in July/August from an autumn sowing, and stored like potatoes for later use[1]. It is best harvested as required[164]. The roots contain about 20% starch and 4% protein[74]. Young stems - raw or cooked[74]. Some caution is advised, see notes at the top of the sheet.

nrakta Europe to W. Asia. ksacta Fallow fields and water meadows from 1000 - 2100 metres in Turkey[93].

propta Seed - best sown in the autumn in situ[33]. The seed has a very short viability[1] or, according to another report, the seed becomes dormant if allowed to dry out and will not germinate for a year[164]. If stored for a spring sowing it should be kept in damp sand in a cold but frost-free place and then sown in situ in March[1]. Another alternative is to sow the seed in the autumn in a seed tray in a cold frame and then to sow the seed, soil and all, in early April in situ[164].

nwatta An easily grown plant, succeeding in almost any soil[1], though it prefers a moist soil[27]. Tolerates a pH in the range 4.6 to 7. The turnip-rooted chervil is occasionally cultivated for its edible root[46, 61], there is at least one named variety[183]. The sub-species *C. bulbosum* prescottii (synonym *C. prescottii*) is used in Russia[74]. The root of this sub-species contains about 17% starch[74].

6.2.154 Chaenomeles x superba

Dwarf Quince, Flowering Quince

5 tlin 8 cyuc 3 kcaak 3 tcan 0 dwat 1 m hkuc pcmhmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Chaenomeles x superba is a deciduous Shrub growing to 1 m (3ft 3in) by 2 m (6ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from February to June, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - very harsh and acid raw but fragrant when cooked. Used for jams, jellies etc and as a flavouring with cooked apples[K]. The fruit can be apple or pear-shaped and up to 6cm long x 6cm wide[200].

tcanta Hedge HedgePlants can be grown to make a medium sized hedge[200]. Some cultivars, such as 'Crimson and Gold' produce suckers prolifically and are suitable for ground cover[182].

nrakta A hybrid of garden origin, *C. japonica* x *C. speciosa*. ksacta Not known in the wild.

propta Seed - best sown as soon as it is ripe in a sheltered position outdoors or in a cold frame[200]. Sow stored seed in February in a greenhouse[78]. Germination usually takes place within 6 weeks[78]. Prick out the seedlings into individual pots as soon as they are large enough to handle. If

well grown, these seedling can be large enough to plant out in the summer, but give them some protection in their first winter. Otherwise plant them out in late spring of the following year[K]. This species is a hybrid and so will not breed true from seed. Cuttings of half-ripe wood, July/August in a frame[11]. Easy[113]. Cuttings of mature wood of the current year's growth, November in a cold frame. Layering in late spring or in autumn. This is a sure and easy method, though it takes 12 months[78, 200].

nwatta Landscape Uses:Border, Erosion control, Ground cover, Massing, Woodland garden. Easily cultivated in any reasonably good soil[1, 11]. Prefers a deep moist well-drained loam[11]. Grows well in heavy clay soils. Tolerates full shade but requires a sunny position for best fruit production[3, 11, 200]. Becomes chlorotic on very alkaline soils[200]. Tolerates atmospheric pollution[200]. Plants are hardy to about -25°C[200]. A very ornamental plant, there are many named varieties[200, 202]. A good bee plant, flowering early in the year and providing pollen and nectar[108]. Plants in this genus are notably resistant to honey fungus[200]. Special Features:Not North American native, Attractive flowers or blooms. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

6.2.155 Cynara scolymus

Globe Artichoke

5 tlin 9 cyuc 3 kcaak 2 tcan 5 dwat 1.5 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwishsom hpa7tmwatli xre7t hjonli

drutta Cynara scolymus is a PERENNIAL growing to 1.5 m (5ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from August to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in saline soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

pcista Can cause allergic reactions (dermatitis) due to lactones. [301]. Use with caution in cases of biliary obstruction. May hinder breast feeding (lactation) [301].

kcakta Edible Parts: Flowers Leaves StemEdible Uses: Curdling agentFlower buds - raw or cooked[2, 7, 15, 16, 27, 37, 183]. Used before the flowers open[171]. The flavour is mild and pleasant[K]. Gobe artichokes are considered to be a gourmet food but they are very fiddly to eat. The buds are harvested just before the flowers open, they are then usually boiled before being eaten. Only the base of each bract is eaten, plus the 'heart' or base that the petals grow from [K]. Small, or baby artichokes, that are produced on lateral stems can be pickled or used in soups and stews[183]. Plants yield about 5 to 6 main heads per year from their second year onwards[200]. Flowering stems - peeled and eaten raw or cooked. A sweet nutty flavour[183]. Young leaf stems - a celery substitute[200]. They are normally blanched to remove the bitterness and then boiled or eaten raw[183]. We find them too bitter to be enjoyable[K]. Leaves - cooked. A bitter flavour[15, 61]. The dried flowers are a rennet substitute, used for curdling plant milks[4, 183].

tcanta DyeA dark grey dye is obtained from the leaves[7].

dwatta Anticholesterolemic Antirheumatic Appetizer Cholagogue Digestive Diuretic Hypoglycaemic LithotropicThe globe artichoke has become important as a medicinal herb in recent years following the discovery of cynarin. This bitter-tasting compound, which is found in the leaves, improves liver and gall bladder function, stimulates the secretion of digestive juices, especially bile, and lowers blood cholesterol levels[238, 254]. The leaves are anticholesterolemic, antirheumatic, cholagogue, digestive, diuretic, hypoglycaemic and lithotropic[7, 21, 165]. They are used internally in the treatment of chronic liver and gall bladder

diseases, jaundice, hepatitis, arteriosclerosis and the early stages of late-onset diabetes[238, 254]. The leaves are best harvested just before the plant flowers, and can be used fresh or dried[238]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve *Cynara scolymus* (*Cynara cardunculus* subsp. *flavescens*) for liver and gallbladder complaints, loss of appetite (see [302] for critics of commission E).

nrakta Not known in the wild, it probably arose from a form of *C. cardunculus*. **ksacta** Not known in the wild.

propta Seed - sow early spring in a greenhouse. Germination is usually quick and good, prick out the seedlings into individual pots as soon as they are large enough to handle and plant them out into their permanent positions during the summer. It would be prudent to give the plants some winter protection in their first year. The seed can also be sown in situ in April. Sow the seed 2cm deep, putting 2 or 3 seeds at each point that you want a plant[1]. Protect the seed from mice[1]. Division of suckers. This is best done in November and the suckers overwintered in a cold frame then planted out in April. Division can also be carried out in March/April with the divisions being planted out straight into their permanent positions, though the plants will be smaller in their first year.

nwatta Prefers a light warm soil and an open position in full sun[15, 16, 33, 37]. Requires plenty of moisture in the growing season and a good rich soil[200]. Prefers a sheltered position[200] but plants are reasonably wind resistant[K]. Plants are tolerant of saline conditions[4]. Plants succeed in cool climates though they may need protection in cold winters[200], they are unlikely to thrive in the north of Britain. Wet winters are far more likely to cause problems than cold ones[4, K]. The globe artichoke is often cultivated in the garden and sometimes commercially for its edible flower buds, there are some named varieties[183, 200]. It is best to renew the plants by division of the suckers every 3 years but they do live for a number of years[200]. The plant has recently been reclassified (1999) as not having specific status but being part of *C. cardunculus*. However, since it is distinct enough from the gardener's viewpoint (having a much larger seedhead) we have decided to leave it with its own entry for the time being[K]. Plants seem to be immune to the predations of rabbits[233]. The flowering plant is a magnet for bees[108]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fleshy. Thick or swollen - fibrous or tap root [2-1].

6.2.156 Berberis rubrostilla

5 tlin 9 cyuc 3 kcaak 1 tcan 2 dwat 1.5 m hkuc
hmmhtut cyutli kyuctup hwicli hyishrasjlutnykfrrip hpa7tli flatprikkwis hpa7tmwatli xre7t hjonli

drutta *Berberis rubrostilla* is a deciduous Shrub growing to 1.5 m (5ft) by 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. Fairly large for a barberry, it is pear shaped with an acid flavour[K]. It can be eaten raw in small quantities, though most people would probably prefer to cook it in pies, preserves etc[K]. The fruits are about 15mm long[200].

tcanta DyeA yellow dye is obtained from the root.

dwatta Antibacterial Cancer DysenteryBerberine, universally present in rhizomes of *Berberis* species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with *Glycyrrhiza* species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta A hybrid of garden origin, *B. aggregata* x *B. wilsoniae*? **ksacta** Not known in the wild.

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. A hybrid species, it will not breed true from seed. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78].

nwatta Prefers a warm moist loamy soil but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. Succeeds in full sun or light shade[11, 200]. This is probably not a true species but a hybrid involving *B. wilsonae* and perhaps *B. aggregata*. There are a number of named varieties selected for their ornamental value, many of these have quite large fruits which are freely borne. The cultivar 'Crawleyensis' has fruits up to 1.5cm long[200]. Hybridizes freely with other members of this genus[1]. Plants can be pruned back quite severely, they resprout well from the base[200].

6.2.157 Mentha aquatica

Water Mint

5 tlin 9 cyuc 3 kcaak 3 tcan 3 dwat 1 m hkuc
hmmhtut cyutli tcuphja7nhs6s hwicli hrasjlutnykfrrip hpa7tli flatprikkwis hpa7tmwatli xre7t hjonli

drutta *Mentha aquatica* is a PERENNIAL growing to 1 m (3ft 3in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from July to October, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can grow in water.

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

kcakta Edible Parts: LeavesEdible Uses: Condiment TeaLeaves - raw or cooked. A strong distinctive peppermint-like fragrance[183]. Used as a flavouring in salads or cooked foods[5]. The leaves are too pungent for most people to use as a flavouring[244]. A herb tea is made from the leaves[21, 183].

tcanta Repellent StrewingThe plant repels flies, mice and rats[14, 20, 244]. It has a pleasant, fresh scent and was formerly used as a strewing herb and has been strewn in granaries to keep mice and rats off the grain[14, 244]. The plant, harvested before flowering, yields about 0.8% essential oil[240]. The fresh or dried plant is very good when used in herbal baths and can also be used in herb pillows[244]. Water garden.

dwatta Anodyne Antidiarrhoeal Antiseptic Antispasmodic Astringent Carminative Cholagogue Diaphoretic Emetic Refrigerant Stimulant Stomachic Tonic VasodilatorThe leaves are anodyne, antiseptic, antispasmodic, astringent, carminative, cholagogue, diaphoretic, emetic, refrigerant, stimulant, stomachic, tonic and vasodilator[4, 9, 21]. A tea made from the leaves has traditionally been used in the treatment of fevers, headaches, digestive disorders and various minor ailments[222]. It is also used as a mouth-wash and a gargle for treating sore throats, ulcers, bad breath etc[9]. The leaves are harvested as the plant comes into flower and can be dried for later use[238]. The essential oil in the leaves is antiseptic, though it is toxic in large doses[222].

nrakta Europe, including Britain, south and east to N. Africa and southwest Asia Also in S. Africa, Madeira **ksacta** Swamps, fen, marshes, near rivers, streams and ponds, in wet woods[9].

It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

kcakta Edible Parts: Leaves SeedEdible Uses: Seed - cooked[105, 177]. The seed is up to 25mm long[200]. It can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed contains bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. Young leaves - cooked. A famine food when all else fails[177]. The roasted seed is a coffee substitute.

tcanta Charcoal Dye Fodder Fuel Repellent Tannin WoodA leach of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. A black dye is obtained from the seed cups[109]. Wood - used for boat building and construction[109]. The wood is also used for fuel and charcoal[11, 109].

dwatta Astringent DysenteryThe stem bark is used to clean foul sores[218]. The seeds are used in the treatment of diarrhoea, menorrhagia and gastrointestinal hyper trophy[218]. The cupule (seed cup) is astringent[218]. Any galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta E. Asia - China, Japan, Korea. **ksacta** Often forming pure forests or growing with *Pinus* species, to 1000 metres in W. China[109].

propta Seed - quickly loses viability if allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed but must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Fodder: Mast Industrial Crop: Tannin Management: Standard Regional Crop Staple Crop: Balanced carbLandscape Uses:Aggressive surface roots possible, Specimen, Street tree. Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Lime tolerant[188]. Young plants tolerate reasonable levels of shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. Prefers warmer summers than are usually experienced in Britain, trees often grow poorly in this country and fail to properly ripen their wood resulting in frost damage overwinter[200]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. The seed ripens in its second year[200]. This species is closely related to *Q. variabilis*[1]. Often cultivated in China as a coppiced tree for fuel and charcoal[109]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200]. Special Features:Not North American native, Attractive flowers or blooms. The plant is heat tolerant in zones 8 through 3. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit

and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2].

6.2.225 Vitis arizonica

Canyon Grape

5 tlin 9 cyuc 2 kcaak 0 tcan 0 dwat 5 m hkuc
hmmhtut cyutli kyuctup hwicli hrasjlutnyk hpa7tli flatprikkwis hpa7tmwatli xre7t hjonli

drutta *Vitis arizonica* is a deciduous Climber growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to July, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit - raw or dried for winter use[161, 177, 257]. The fruit is fairly small, but it is quite luscious[2]. The fruit is about 10mm in diameter[200] and is borne in bunches. Leaves - raw. Chewed to allay thirst. Young leaves are wrapped around other foods and then baked, they impart a pleasant flavour. Young tendrils - raw or cooked.

tcanta DyeA yellow dye is obtained from the fresh or dried leaves[168].

nrakta South-western N. America. **ksacta** Streamsid es and in canyons, often climbing into trees, 600 - 2260 metres in Arizona and Utah.

propta Seed - best sown in a cold frame as soon as it is ripe[K]. Six weeks cold stratification improves the germination rate, and so stored seed is best sown in a cold frame as soon as it is obtained. Germination should take place in the first spring, but sometimes takes another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant out in early summer. Cuttings of mature wood of the current seasons growth, December/January in a frame. These cuttings can be of wood 15 - 30cm long or they can be of short sections of the stem about 5cm long with just one bud at the top of the section. In this case a thin, narrow strip of the bark about 3cm long is removed from the bottom half of the side of the stem. This will encourage callusing and the formation of roots. Due to the size of these cuttings they need to be kept in a more protected environment than the longer cuttings. Layering.

nwatta Prefers a deep rich moist well-drained moderately fertile loam[1, 200]. Grows best in a calcareous soil[200]. Succeeds in sun or partial shade though a warm sunny position is required for the fruit to ripen[200]. Plants climb by means of tendrils[182]. Any pruning should be carried out in winter when the plants are dormant otherwise they bleed profusely[182, 200]. Plants in this genus are notably susceptible to honey fungus[200].

6.2.226 Viburnum erubescens gracilipes

5 tlin 9 cyuc 2 kcaak 0 tcan 0 dwat 5 m hkuc
hmmhtut cyutli tcup hwicli hrasjlutnyk hpa7tli flatprikkwis hpa7tmwatli xre7t hjonli

drutta *Viburnum erubescens gracilipes* is a deciduous Shrub growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in July, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. A sweet flavour but there is very little flesh in relation to the size of the single large seed[K].

tcanta WoodWood - soft to hard, close and even grained. The wood is hardest in the cooler parts of its range, the Himalayan form is a possible Boxwood (*Buxus* spp) substitute[146].

Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200]. Softwood cuttings from strongly growing plants in spring to early summer in a frame[200]. Layering in spring.

nwatta Thrives in a well-drained moisture-retentive loamy soil[11, 200]. Prefers some lime in the soil but is likely to become chlorotic if too much lime is present[1]. Succeeds in sun or partial shade though it fruits better in a sunny position[11, 200]. This species is unable to tolerate much shade competition from other trees[229]. A fast-growing but short-lived species in the wild[229]. The flowers diffuse a soft honey scent[245]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. Plants in this genus are notably susceptible to honey fungus[200].

6.2.222 Pyrocydonia danielii

5 tlin 9 cyuc 2 kcaak 0 tcan 0 dwat 5 m hkuc hmimhtut cyutli hgattcup hwicli hrasjlutnyikfripr hpa7tli flat-prikklwis hpa7tmwatli dyatxre7t hjonli

drutta Pyrocydonia danielii is a deciduous Tree growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 6. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[K]. Fully ripe fruits are crisp and juicy and the flavour is rather pear-like, though of inferior quality to most pears[K].

nrakta A graft hybrid of garden origin, Cydonia oblonga x Pyrus communis 'Williams Bon Cretien' ksacta Not known in the wild.

propta Seed. A bigeneric hybrid, it will not breed true from seed even if fertile seed is produced. If by chance you do obtain seed, then it is best sown in the autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the cold frame for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of softwood in early summer, treated with rooting hormone and rooted in a closed case with bottom heat[200]. Grafting onto Pyrus communis.

nwatta Prefers a good well-drained loam in full sun[200]. Grows well in heavy clay soils. Tolerates light shade but does not fruit so well in such a position. Tolerates atmospheric pollution, excessive moisture and a range of soil types if they are moderately fertile[200]. Established plants are drought tolerant[200].

6.2.223 Aesculus pavia

Red Buckeye

5 tlin 9 cyuc 2 kcaak 0 tcan 1 dwat 5 m hkuc pcmimhmhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flat-prikklwis hpa7tmwatli xre7t hjonli

drutta Aesculus pavia is a deciduous Shrub growing to 5 m (16ft) by 3 m (9ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in June, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The seed is rich in saponins[169]. Although poisonous, saponins are poorly absorbed by the human body and so most pass through without harm. Saponins are quite bitter and can be found in many common foods such as some beans. They can be removed by carefully leaching the seed or flour in running water. Thorough cooking, and perhaps changing

the cooking water once, will also normally remove most of them. However, it is not advisable to eat large quantities of food that contain saponins. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K].

kcakta Edible Parts: SeedEdible Uses: Seed - cooked. It can be dried and ground into a powder and used as a gruel. The seed is quite large, about 25mm in diameter[227], and is easily harvested. Unfortunately, the seed is also rich in saponins and these need to be removed before it can be eaten. See also the notes above on toxicity. The following notes apply to A. californica, but are probably also relevant here:- The seed needs to be leached of toxins before it becomes safe to eat - the Indians would do this by slow-roasting the nuts (which would have rendered the saponins harmless) and then cutting them into thin slices, putting them into a cloth bag and rinsing them in a stream for 2 - 5 days[213]. Most of the minerals etc would also have been leached out by this treatment[K].

tcanta Soap WoodSaponins in the seed and roots are a soap substitute[149, 169]. The saponins can be easily obtained by chopping the seed into small pieces and infusing them in hot water. This water can then be used for washing the body, clothes etc. Its main drawback is a lingering odour of horse chestnuts[K].

dwatta Cancer Hypnotic Odontalgic SalveThe powdered bark is hypnotic and odontalgic. It is used in the treatment of ulcers[149, 192, 227]. A poultice of the powdered seeds has been used in the treatment of cancer tumours and infections, and as a salve for sores[257]. An infusion of the roots has been used as a bath in the treatment of dyspepsia[257].

nrakta South-eastern N. America - Virginia to Florida, west to Louisiana. ksacta Rich moist soils in deciduous woods, on the sides of streams and swamp margins[149, 192, 229].

propta Seed - best sown outdoors or in a cold frame as soon as it is ripe[11, 80]. The seed germinates almost immediately and must be given protection from severe weather[130]. The seed has a very limited viability and must not be allowed to dry out. Stored seed should be soaked for 24 hours prior to sowing and even after this may still not be viable[80, 113]. It is best to sow the seed with its 'scar' downwards[130]. If sowing the seed in a cold frame, pot up the seedlings in early spring and plant them out into their permanent positions in the summer. Division of suckers in the dormant season[200]. The suckers can be planted out straight into their permanent positions if required.

nwatta Landscape Uses:Specimen, Street tree, Woodland garden. Prefers a deep loamy well-drained soil but is not too fussy[1, 11]. Very shade tolerant, it also succeeds in a sunny position[200]. A very ornamental shrub, when dormant it is hardy to about -15°C[184] though the young growth in spring can be damaged by late frosts. It prefers a continental climate, growing best in eastern and south-eastern England[200]. Trees are fast-growing in the wild, though they are also short-lived[229]. They can commence flowering when only 1 metre tall[229]. Plants spread by means of suckers[200]. There are a number of named varieties, developed for their ornamental value. Var. 'Humilis' is a low growing form[182]. Most members of this genus transplant easily, even when fairly large[11]. Special Features: Attractive foliage, North American native, All or parts of this plant are poisonous, Attracts butterflies, Blooms are very showy.

6.2.224 Quercus acutissima

Sawthorn Oak

5 tlin 9 cyuc 2 kcaak 3 tcan 2 dwat 5 m hkuc hmimhtut cyutli tcup hwicli jlutnyikfripr hpa7tli flatprikklwis hpa7tmwatli hjonli

drutta Quercus acutissima is a deciduous Tree growing to 5 m (16ft) by 15 m (49ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade.

propta Seed - sow spring in a cold frame. Germination is usually fairly quick. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. Mentha species are very prone to hybridisation and so the seed cannot be relied on to breed true. Even without hybridisation, seedlings will not be uniform and so the content of medicinal oils etc will vary. When growing plants with a particular aroma it is best to propagate them by division[K]. Division can be easily carried out at almost any time of the year, though it is probably best done in the spring or autumn to allow the plant to establish more quickly. Virtually any part of the root is capable of growing into a new plant. Larger divisions can be planted out direct into their permanent positions. However, for maximum increase it is possible to divide the roots up into sections no more than 3cm long and pot these up in light shade in a cold frame. They will quickly become established and can be planted out in the summer.

nwatta Succeeds in most soils and situations so long as the soil is not too dry[1, 16, 200]. Grows well in heavy clay soils. A sunny position is best for production of essential oils, but it also succeeds in partial shade. Plants can grow in water up to 15cm deep[24]. Most mints have fairly aggressive spreading roots and, unless you have the space to let them roam, they need to be restrained by some means such as planting them in containers that are buried in the soil[K]. Hybridizes freely with other members of this genus. The whole plant, especially when bruised, has a pungent aroma of bergamot[245]. The flowers are especially attractive to bees and butterflies[24]. A good companion for brassicas[14]. Members of this genus are rarely if ever troubled by browsing deer[233].

6.2.158 Chaenomeles japonica

Dwarf Quince, Maule's quince, Japanese Flowering Quince 5 tlin 8 cyuc 3 kcaak 3 tcan 0 dwat 1 m hkuc pcmimhmhtut cyutli tcup hwicli hrasjlutnyikfripr hpa7tli flat-prikklwis hpa7tmwatli xre7t hjonli

drutta Chaenomeles japonica is a deciduous Shrub growing to 1 m (3ft 3in) by 2 m (6ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in April, and the seeds ripen from November to January. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 3, 4, 11, 177, 183]. Very harsh and acid raw but fragrant when cooked, imparting a strong pleasant flavour to jams and jellies[1, 200], it is especially good cooked with apples in apple pies[K]. The fruit is apple-shaped and about 4cm in diameter[200]. The rich aromatic juice, as tart as a lemon, is squeezed and used for culinary purposes[183].

tcanta Plants sucker freely and can be used as a ground cover. The form C. japonica alpina grows to about half the size of the species, it is especially suitable and can be planted about 1 metre apart each way[208].

nrakta E. Asia - Japan ksacta Woods in low mountains, C. and S. Japan[58].

propta Seed - best sown as soon as it is ripe in a sheltered position outdoors or in a cold frame[200]. Sow stored seed in February in a greenhouse[78]. Germination usually takes place within 6 weeks[78]. Prick out the seedlings into individual pots as soon as they are large enough to handle. If well grown, these seedling can be large enough to plant out in the summer, but give them some protection in their first winter. Otherwise plant them out in late spring of the following year[K]. Cuttings of half-ripe wood, July/August in a frame[11]. Easy[113]. Cuttings of mature wood of the current year's growth, November in a cold frame. Layering in late spring or in autumn. This is a sure and easy method, though it takes 12 months[78, 200]. Division of suckers in late winter[113]. They can be planted out straight into their permanent positions.

nwatta Landscape Uses:Border, Hedge, Massing, Woodland garden. Easily cultivated in any reasonably good soil[1].

Prefers a deep moist well-drained loam[4, 11]. Grows well in heavy clay soils. Tolerates full shade but requires a sunny position for best fruit production[3, 11, 200]. Becomes chlorotic on very alkaline soils[200]. Tolerates atmospheric pollution[200]. A very ornamental plant[1], it is hardy to about -25°C[200] and fruits freely in Britain[11]. Plants are occasionally cultivated for their edible fruit[183]. This species is closely allied to C. speciosa[11]. A good bee plant, flowering early in the year and providing pollen and nectar[108]. Plants in this genus are notably resistant to honey fungus[200]. Special Features:Not North American native, Attractive flowers or blooms. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

6.2.159 Lycium pallidum

Pale Wolfberry, Pale desert-thorn, Rabbit thorn

5 tlin 9 cyuc 3 kcaak 3 tcan 2 dwat 1.8 m hkuc htut cyutli kyuctcup hwicli hrisjshrasjlutnyik hpa7tli flatprikklwis hpa7tmwatli xre7t hjonli

drutta Lycium pallidum is a deciduous Shrub growing to 1.8 m (6ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

pcista Although no records of toxicity have been seen for this species, it does belong to a family that contains many poisonous plants. Some caution should be applied, especially towards leaves or unripe fruits, though ripe fruits are almost certainly edible.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw, cooked or dried for later use[[46, 61, 85, 183, 257]. The fruit keeps well when dried and ground into a meal[183]. The fruit should be perfectly ripe if it is eaten raw[95]. The Hopi Indians boiled the fruit, drained off the water and ground the fruit into a mush. Clay was then mixed with water until a thick consistency was achieved, this was mixed with the berries and the whole lot eaten[216]. The fruit is about 10mm in diameter[200].

tcanta Soil stabilizationPlants have an extensive root system and can be planted to stabilize banks[200].

dwatta Cancer OdontalgicThe ground up root has been placed in a tooth cavity to bring relief from toothache[257]. The bark and the dried berries have been used as a 'life medicine'[257]. The fruit of many members of this genus is a very rich source of vitamins and minerals, especially in vitamins A, C and E, flavanoids and other bio-active compounds. It is also a fairly good source of essential fatty acids, which is fairly unusual for a fruit. It is being investigated as a food that is capable of reducing the incidence of cancer and also as a means of halting or reversing the growth of cancers[214].

nrakta Central and Southern N. America. ksacta Dry plains and hills.

propta Seed - sow early spring in a greenhouse. Germination is usually good and fairly quick. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse for their first winter. Plant out in late spring or early summer. Pinch out the shoot tips of the young plants in order to encourage bushy growth[78]. Cuttings of half-ripe wood, 5 - 10cm with a heel if possible, July/August in individual pots in a frame. Good percentage[78]. Cuttings of mature wood of the current season's growth, autumn to late winter in a cold frame. High percentage[78, 200]. Division of suckers in late winter. Very easy, the suckers can be planted out direct into their permanent positions. Layering.

nwatta Does not require a rich soil, flowering and fruiting better in a well-drained soil of moderate quality[11]. Succeeds in impoverished soils[200]. Requires a sunny position[200]. Tolerates maritime exposure[200]. Hardy to about

-17°c[200]. Plants do not always fruit well in Britain[11], particularly after a cool summer[200].

6.2.160 Ribes sativum

Redcurrant
5 tlin 9 cyuc 3 kcaok 0 tcan 0 dwat 1 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta Ribes sativum is a deciduous Shrub growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

ksakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked in jams, compotes, jellies, puddings, pies etc[183, 200]. An acid taste that many people find too strong to eat raw, the fruit makes an excellent jam or preserves[K]. The fruit is rich in vitamin C[183]. There are rather a lot of seeds in each fruit[K].

nrakta W. Europe, possibly including Britain. ksacta Hedges and woods, avoiding acid soils.

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. Stored seed requires 3 months cold stratification at between 0 and 5°c and should be sown as early in the year as possible[113, 164]. Under normal storage conditions the seed can remain viable for 17 years or more. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter, planting them out in late spring of the following year. Cuttings of half-ripe wood, 10 - 15cm with a heel, July/August in a frame[78, 113]. Cuttings of mature wood of the current year's growth, preferably with a heel of the previous year's growth, November to February in a cold frame or sheltered bed outdoors[78, 200].

nwatta Easily grown in a moisture retentive but well-drained loamy soil of at least moderate quality[11, 200]. Plants are quite tolerant of shade, succeeding on an east or even a north-facing wall, though not fruiting so well in such a position[11]. Prefers a pH in the range 5.5 to 6[200]. Hardy to about -20c[200]. There is some confusion in nomenclature with some botanists recognising 2 species of red currants, this species and *R. spicatum* (syn *R. rubrum*), whilst others say that *R. rubrum* is a distinct species[17, 200]. The red currant is sometimes cultivated for its edible fruit, there are some named varieties[183]. Most cultivars are self-fertile and set a good crop on their own[200]. The fruit is produced at the base of one-year old and older wood, plants start to fruit at 3 - 4 years from seed[200]. Red currant fruits are an absolute magnet for birds and so the plants will usually need some protection to allow the crop to ripen[K]. Alternatively, you can put this attraction for the birds to good use by planting red currants specifically for the birds. Whilst they are eating these fruits they will not be eating your other fruits[K]. Plants can harbour a stage of 'white pine blister rust', so should not be grown in the vicinity of pine trees[155]. Plants in this genus are notably susceptible to honey fungus[200].

6.2.161 Osmorhiza claytonii

Woolly Sweet-Cicely, Clayton's sweetroot
5 tlin 9 cyuc 3 kcaok 1 tcan 1 dwat 1 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta Osmorhiza claytonii is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

ksakta Edible Parts: Leaves Root SeedEdible Uses: CondimentRoot - cooked and eaten as a vegetable[46, 105, 183]. Used for putting on weight[61, 161]. Leaf stalks - cooked and used as a vegetable[183]. The aromatic roots and

unripe seeds are used as anise-like flavourings[183]. Pleasant to chew[207].

tcanta Scented.
dwatta Ophthalmic PoulticeThe root has been chewed or gargled as a treatment for sore throats[222, 257]. A poultice of the moistened pulverized roots has been applied to boils, cuts, sores etc whilst a tea made from the roots has been used to bathe sore eyes[222, 257].

nrakta Eastern N. America - Nova Scotia to South Dakota, North Carolina, Illinois, Nebraska and Kansas. ksacta Woods and wooded slopes[43].

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

nwatta Succeeds in any deep moisture-retentive soil in sun or dappled shade[200]. Plants are hardy to about -20°c[200]. Well suited to naturalistic plantings in a woodland or wild garden[200]. A sweetly aromatic plant[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2]. The root pattern is fleshy. Thick or swollen - fibrous or tap root [1-2].

6.2.162 Lepidium latifolium

Dittander, Broadleaved pepperweed
5 tlin 9 cyuc 3 kcaok 0 tcan 1 dwat 1.2 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwish-som hpa7tmwatli xre7t hjonli

drutta Lepidium latifolium is a PERENNIAL growing to 1.2 m (4ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from June to July, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in saline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

ksakta Edible Parts: Leaves RootEdible Uses: CondimentYoung leaves - raw or cooked[2, 61, 74]. A very hot cress-like flavouring[K]. The leaves are nice when used in small quantities as a flavouring in salads[K]. Some reports also suggest using them as a potherb[183], though they have always seemed to be too strong for us to want to try this[K]. The leaves are available very early in the year[K]. Root - it can be grated and made into a sauce which is used as a horseradish substitute[2, 5, 183]. It has a pungently hot flavour. Seed - used as a condiment[177, 183].

tcanta InsecticideUsed as an insecticide[100]. No further details are given, but it is likely to be a strong infusion of the leaves and stems that is used.

dwatta Antiscorbutic Depurative Hepatic Kidney Resolvent StomachicThe plant is antiscorbutic, depurative and stomachic[61, 240]. An infusion of the plant is used in the treatment of liver and kidney diseases, it increases cardiac amplitude, decreases frequency and regulates the rhythm[240]. It is also used as a resolvent in the treatment of skin diseases[240].

nrakta Europe, including Britain, from Scandanavia south and east to N. Africa and W. Asia. ksacta Salt marshes and wet sands[17] on the south and east coasts[5].

propta Seed - sown spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the spring. Division in spring. Plant them out direct into their permanent positions. Division is very simple and succeeds at almost any time of the year[K].

nwatta A very easily grown plant, it succeeds in most soils in sun or light shade. Plants have been surviving quite happily with us, and are still spreading freely, in dense grass that is rarely cut[K]. Dittander was formerly cultivated as a food condiment in Britain and in ancient Greece[17, 183]. It

undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

6.2.220 Thamnocalamus spathiflorus

5 tlin 9 cyuc 2 kcaok 0 tcan 0 dwat 6 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Thamnocalamus spathiflorus is an evergreen Bamboo growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

ksakta Edible Parts: Seed StemEdible Uses: Young shoots - cooked[177]. Seed - cooked and used as a cereal[177]. The plants only flower and produce seed at intervals of several years.

tcanta Basketry Hedge Hedge Plant supportA valuable plant for screen planting in wet areas[200]. The canes are used for making baskets and pipes[25, 46, 51, 195]. They can also be used as plant supports[146]. The canes are quite brittle and so are not very useful for weaving, in their native range they are only used when better species are not available[220].

nrakta E. Asia - W. Himalayas. ksacta Forming thickets in damp sites in cedar, oak and fir forests up to 3600 metres[51, 200]. Prefers growing on steeply sloping sites[220].

propta Seed - surface sow as soon as it is ripe in a greenhouse at about 20°c. Do not allow the compost to dry out. Germination usually takes place fairly quickly so long as the seed is of good quality, though it can take 3 - 6 months. Grow on in a lightly shaded place in the greenhouse until large enough to plant out. Seed is rarely available. Division in spring as new growth commences. Take divisions with at least three canes in the clump, trying to cause as little root disturbance to the main plant as possible. Grow them on in light shade in a greenhouse in pots of a high fertility sandy medium. Mist the foliage regularly until plants are established. Plant them out into their permanent positions when a good root system has developed, which can take a year or more[200]. Basal cane cuttings.

nwatta Succeeds in most soils in sun or shade so long as the soil is moist[200]. Prefers a good loamy soil in a semi-shaded position[1, 11, 25], the leaves curling up when the plant grows in strong sunlight. Dislikes drought[1]. Requires a position sheltered from cold winds[25, 195]. When grown outdoors, this species is only hardy in the milder areas of Britain[195]. Plants are hardy to about -20°c according to another report. This species is notably resistant to honey fungus[200]. A clump-forming species, it does not hinder the regeneration of tree growth in its native range and is also a very valuable species for providing food and shelter for wildlife[267]. Plants only flower at intervals of many years. When they do come into flower most of the plants energies are directed into producing seed and consequently the plant is severely weakened. They sometimes die after flowering, but if left alone they will usually recover though they will look very poorly for a few years. If fed with artificial NPK fertilizers at this time the plants are more likely to die[122].

The rootstock is caespitose[25]. Closely related to *T. aristatus*[200].

6.2.221 Prunus emarginata

Bitter Cherry
5 tlin 9 cyuc 2 kcaok 0 tcan 2 dwat 5 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Prunus emarginata is a deciduous Tree growing to 5 m (16ft 5in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in May, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

ksakta Edible Parts: Fruit SeedEdible Uses: Fruit - raw or cooked[229]. Intensely bitter[1, 11, 82, 99]. Some native North American Indian tribes saw the fruit as a great delicacy and an important food source, though others only ate it occasionally because of its bitter taste[257]. The fruit is 8 - 15mm in diameter with a thick flesh, and contains one large seed[229]. Seed - raw or cooked. Do not eat the seed if it is too bitter - see the notes above on toxicity.

tcanta Basketry Dye Fuel Plaster String WoodA green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168]. The bark is used to ornament baskets and is also split into strips and used for making baskets that are watertight and resist decay[99, 257]. The bark is both strong and flexible as well as being ornamental[257]. The thin outer bark can be peeled off the tree in the same way as birch trees[226]. It has been used to make baskets, mats, ropes and as an ornament on bows, arrows etc[226, 257]. The bark can also be made into a string[257]. Wood - close-grained, soft, brittle[82]. It is sometimes used for furniture because it takes a high polish[229]. An excellent fuel[99].

dwatta Blood purifier Cardiac Contraceptive Eczema Laxative Plaster TB TonicBitter cherry was employed medicinally by several native North American Indian tribes who used it to treat a variety of complaints[257]. It is little, if at all, used in modern herbalism. The bark is blood purifier, cardiac, laxative and tonic[257]. An infusion of the bark has been used in the treatment of tuberculosis and eczema[257]. A decoction of the root and inner bark has been taken daily as a treatment for heart troubles[257]. An infusion of the bark, combined with crab apple bark (*Malus* spp) has been used as a cure-all tonic in treating colds and various other ailments[257]. The bark, stuck on with resin, has been used as a dressing for wounds, swellings etc[226, 257]. An infusion of the rotten wood has been used as a contraceptive[257]. Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta Western N. America - British Columbia to California and New Mexico. ksacta Moist woods or by watercourses in grassland and sagebrush desert at medium elevations in mountains[60].

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113].

to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta Europe to E. Asia - Spain to China. Rarely sown in Britain. ksacta Found in secondary georgian oak forests.

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°c and then cold stratified for another 3 months at 4°c[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. A very ornamental plant[1].

6.2.218 *Thamnocalamus aristatus*

5 tlin 9 cyuc 2 kcaak 0 tcan 0 dwat 6 m hkuic hmimhtut cyutli tcup hwicli hrasjlutnykrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Thamnocalamus aristatus is an evergreen Bamboo growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcaakta Edible Parts: Seed StemEdible Uses: Young shoots - cooked[177]. The new shoots are about 15mm in diameter[K]. Seed - used as a cereal[177]. The plants only flower and produce seed at intervals of several years.

tcanta Basketry Hedge Hedge Plant supportThe canes are used for making walking sticks, baskets and pipes[25, 46, 51, 272]. They can also be used as plant supports[146]. Valuable for screen planting in wet areas[200].

nrakta E. Asia - N.E. Himalayas. ksacta Damp sites in woodland and high savannah[200]. Open, rocky ground at elevations of 2200 - 3100 metres in Nepal[272].

propta Seed - surface sow as soon as it is ripe in a greenhouse at about 20°c. Do not allow the compost to dry out. Germination usually takes place fairly quickly so long as the seed is of good quality, though it can take 3 - 6 months. Grow on in a lightly shaded place in the greenhouse until large enough to plant out. Seed is rarely available. Division in spring as new growth commences. Take divisions with at least three canes in the clump, trying to cause as little root disturbance to the main plant as possible. Grow them on in

light shade in a greenhouse in pots of a high fertility sandy medium. Mist the foliage regularly until plants are established. Plant them out into their permanent positions when a good root system has developed, which can take a year or more[200]. Basal cane cuttings.

nwatta Succeeds in most soils in sun or shade so long as the soil is moist[200]. Prefers a good loamy soil in a semi-shaded position[1, 11, 25], the leaves curling up when the plant grows in strong sunlight. Dislikes drought[1]. Requires a position sheltered from cold winds[25]. This species is only hardy in the milder areas of Britain. Plants are hardy to about -20°c according to another report. This species is notably resistant to honey fungus[200]. Plants only flower at intervals of many years. When they do come into flower most of the plants energies are directed into producing seed and consequently the plant is severely weakened. They sometimes die after flowering, but if left alone they will usually recover though they will look very poorly for a few years. If fed with artificial NPK fertilizers at this time the plants are more likely to die[122]. The rootstock is caespitose[25]. Closely related to *T. spathiflorus*[200].

6.2.219 *Crataegus nigra*

Hungarian Hawthorn

5 tlin 9 cyuc 2 kcaak 0 tcan 2 dwat 6 m hkuic hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnykrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Crataegus nigra is a deciduous Tree growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcaakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[177]. A soft flesh[200]. The fruit can be used in making pies, preserves, etc, and can also be dried for later use. The fruit is about 1cm in diameter[200]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta E. and C. Europe - Hungary. ksacta Woods[50].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°c and then cold stratified for another 3 months at 4°c[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but

is a very invasive plant, capable of spreading more than a metre per year by means of its aggressive root system[K]. It produces new growth early in the year and so can be a useful salad ingredient in late winter[K].

6.2.163 *Primula vulgaris*

Primrose, Common Primrose, English Primrose

5 tlin 10 cyuc 3 kcaak 3 tcan 3 dwat 0.3 m hkuic hmimhtut cyutli tcup hwicli hrasjlutnykrip hpa7tli flatpriklwis hpa7tmwatli fyfkr7t hjonli

drutta Primula vulgaris is a PERENNIAL growing to 0.3 m (1ft) by 0.3 m (1ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from December to May, and the seeds ripen from April to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

kcaakta Edible Parts: Flowers LeavesEdible Uses: TeaYoung leaves - raw or cooked as a potherb, added to soups etc[2, 177, 183]. A mild flavour, though the texture is a bit tough[K]. The leaves are often available all through the winter[K]. Flowers - raw or cooked. They make an attractive garnish to salads[4, 183, 238, K], and can also be used as a cooked vegetable or in preserves etc[4, 183]. Picked when first opened, the flowers are fermented with water and sugar to make a very pleasant and intoxicating wine[2]. Both the flowers and the leaves can be made into a syrup or a tea[183].

tcanta Makes a good carpet in open woodland and on woodland edges[24, 31]. Plants are best spaced about 35cm apart each way[208]. Attractive flowers.

dwatta Anodyne Antispasmodic Astringent Emetic Sedative VermifugePrimroses have a very long history of medicinal use and has been particularly employed in treating conditions involving spasms, cramps, paralysis and rheumatic pains[238]. They are, however, considered to be less effective than the related *P. veris*[238]. The plant contains saponins, which have an expectorant effect, and salicylates which are the main ingredient of aspirin and have anodyne, anti-inflammatory and febrifuge effects[238]. This remedy should not be prescribed for pregnant women, patients who are sensitive to aspirin, or those taking anti-coagulant drugs such as warfarin[238]. The roots and the flowering herb are anodyne, antispasmodic, astringent, emetic, sedative and vermifuge[4]. An infusion of the roots is a good remedy against nervous headaches[4]. The roots are harvested in the autumn when two or three years old and dried for later use[4]. An ointment has been made from the plant and used for treating skin wounds[244].

nrakta Western Europe, including Britain, from Norway south and east to N. Africa and W. Asia. ksacta Woods and hedgerows on acid and calcareous soils[4, 17]. Also found in the open on north-facing slopes in south-western England[31].

propta Seed - best sown as soon as it is ripe in a cold frame[133]. Sow stored seed in early spring in a cold frame[1]. Germination is inhibited by temperatures above 20°c[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in autumn. This is best done every other year[200].

nwatta Landscape Uses:Container, Ground cover, Rock garden, Woodland garden. Prefers a medium to heavy moisture retentive humus rich loam in a cool position with light to medium shade[200]. Grows well in heavy clay soils. Plants are hardy to about -25°c[187]. A very ornamental plant, there are many named varieties[187]. The blooms have a characteristic fragrance of a mossy bank or a deciduous woodland[245]. This species hybridizes readily with *P. elatior*[17]. Special Features: Attractive foliage, Edible, Fragrant foliage, Not North American native, Naturalizing, Suitable for dried flowers, Fragrant flowers.

6.2.164 *Fragaria viridis*

Green Strawberry

5 tlin 9 cyuc 3 kcaak 3 tcan 0 dwat 0.3 m hkuic hmimhtut cyutli tcup hwicli hrasjlutnykrip hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta *Fragaria viridis* is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from April to May, and the seeds ripen from June to July. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcaakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[74, 177]. The fruit are greenish-tinged with red and are sweet and succulent with a rich musky pineapple-like flavour[183]. Absolutely delicious, though they are not produced very freely[K].

tcanta An excellent ground cover plant, spreading vigorously by means of surface stolons and forming a dense carpet[K]. It grows well amongst shrubs but can out-compete smaller plants[K].

nrakta Europe. ksacta Woods and banks[45].

propta Seed - sow early spring in a greenhouse. The seed can take 4 weeks or more to germinate. The seedlings are very small and slow-growing at first, but then grow rapidly. Prick them out into individual pots when they are large enough to handle and plant them out during the summer. Division of runners, preferably done in July/August in order to allow the plants to become established for the following years crop[200]. They can also be moved in the following spring if required, though should not then be allowed to fruit in their first year. The runners can be planted out direct into their permanent positions.

nwatta Prefers a fertile, well-drained, moisture retentive soil in a sunny position[200]. Tolerates semi-shade though fruit production will be reduced when plants grow in such a position. This species is closely related to *F. vesca*[200]. Plants are sometimes dioecious. In this case, male and female plants will be needed if fruit and seed is required.

6.2.165 *Mentha x gracilis*

Ginger Mint

5 tlin 9 cyuc 3 kcaak 0 tcan 2 dwat 0.5 m hkuic hmimhtut cyutli tcup hwicli hrasjlutnykrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta *Mentha x gracilis* is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

kcaakta Edible Parts: LeavesEdible Uses: Condiment TeaLeaves - raw or cooked. They are used as a flavouring in salads or cooked foods[61, 105]. A refreshing odour and taste[183], they are said to go particularly well with melon, tomatoes and fruit salads[238]. The slight ginger scent make them an interesting addition to fresh salads[244]. A herb tea is made from the leaves. An essential oil from the leaves is used as a spearmint flavouring, it is especially used in N. America in chewing gums[183, 238].

tcanta Essential Repellent StrewingThe essential oil obtained from the leaves has a spearmint flavour and is used commercially in N. America[238]. Rats and mice intensely dislike the smell of mint. The plant was therefore used in homes as a strewing herb and has also been spread in granaries to keep the rodents off the grain[244].

dwatta Antiseptic Carminative FebrifugeGinger mint, like many other members of this genus, is often used as a domestic herbal remedy, being valued especially for its antiseptic properties and its beneficial effect on the digestion. Like other members of the genus, it is best not used by pregnant women because large doses can cause an abortion. A tea made from the leaves has traditionally been used in the treatment of fevers, headaches, digestive disorders and various minor ailments[222]. The leaves are harvested as the plant comes into flower and can be dried for later use[238]. The essential oil in the leaves is antiseptic, though it is toxic in large doses[222].

nrakta A hybrid, *M. arvensis* x *M. spicata*. ksacta Not known in a truly wild situation.

propta Seed - sow spring in a cold frame. Germination is usually fairly quick. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. *Mentha* species are very prone to hybridisation and so the seed cannot be relied on to breed true. Even without hybridisation, seedlings will not be uniform and so the content of medicinal oils etc will vary. When growing plants with a particular aroma it is best to propagate them by division[K]. Division can be easily carried out at almost any time of the year, though it is probably best done in the spring or autumn to allow the plant to establish more quickly. Virtually any part of the root is capable of growing into a new plant. Larger divisions can be planted out direct into their permanent positions. However, for maximum increase it is possible to divide the roots up into sections no more than 3cm long and pot these up in light shade in a cold frame. They will quickly become established and can be planted out in the summer.

nwatta Succeeds in most soils and situations so long as the soil is not too dry[1, 200]. Grows well in heavy clay soils. A sunny position is best for production of essential oils, but it also succeeds in partial shade. This species is somewhat less easy in cultivation than most other mints. It can be lost over winter if the weather is very cold or wet so ensure that it is grown in a warm, well-drained sunny position[K]. A sterile hybrid, the result of a cross between *M. arvensis* and *M. spicata*, though it can back-cross with its parents. There are some named varieties[183], most of which have variegated leaves. A polymorphic species[200]. Most mints have fairly aggressive spreading roots and, unless you have the space to let them roam, they need to be restrained by some means such as planting them in containers that are buried in the soil[K]. The whole plant has a strong minty aroma with a hint of ginger[245]. The flowers are very attractive to bees and butterflies. A good companion plant for growing near cabbages and tomatoes, helping to keep them free of insect pests. Members of this genus are rarely if ever troubled by browsing deer[233].

6.2.166 *Barbarea vulgaris*

Yellow Rocket, Garden yellowrocket

5 tlin 9 cyuc 3 kcaak 0 tcan 1 dwat 0.4 m hkuc hmimhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli fyfixre7t hjonli

drutta *Barbarea vulgaris* is a PERENNIAL growing to 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from May to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies, bees, beetles. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcasta There is a report that ingestion of the leaves can lead to kidney malfunction[222].

kcakta Edible Parts: Flowers LeavesEdible Uses: Young leaves - raw or cooked like spinach[2, 9, 27, 46, 52, 95]. A hot cress-like flavour[183]. Young leaves are chopped up finely and added to salads, older leaves can be used as a potherb but they are rather strong and are best cooked in one or two changes of water[183]. The leaves are available all year round, even in the winter, especially if the weather is mild[95, 115]. To increase the productivity of the plants, remove the flowering stems as they appear (they can be eaten

like the leaves[K]) and pick the outer leaves as the plant re-grows[244]. Some caution is advised, see the notes above on toxicity. Young flowering stems - harvested before the flowers open and cooked like broccoli[183].

dwatta Antiscorbutic Appetizer Diuretic VulneraryThe leaves are vulnerary and have been used as a poultice for treating wounds[207, 240]. A tea made from the leaves is appetizer, antiscorbutic and diuretic[222].

nrakta Most of Europe, including Britain, south and east to N. Africa and Asia. ksacta Moist places, roadsides, stream banks and hedges[9].

propta Seed - sow spring or autumn in situ. Germination usually takes place within 2 - 3 weeks. Division in spring. his plant is a short-lived perennial, and also usually self-sows freely, so we have not found division to be worthwhile.

nwatta Succeeds in sun or shade in a moist well-drained soil[1, 111]. Tolerates a pH in the range 4.8 to 7.5. The plant can continue to grow all winter, especially if the weather is mild[183]. A short-lived perennial[1], though plants usually self-sow freely when in a suitable position[K]. There is at least one named form, developed for its ornamental value. 'Variegata' has variegated leaves and grows less strongly than the type[183]. A good bee plant[108].

6.2.167 *Petasites japonicus*

Sweet Coltsfoot, Japanese sweet coltsfoot, Butterbur

5 tlin 9 cyuc 3 kcaak 1 tcan 2 dwat 0.6 m hkuc pcmhmimhtut cyutli tcuphja7n hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli nyanhjen hjonli

drutta *Petasites japonicus* is a PERENNIAL growing to 0.6 m (2ft) by 1.5 m (5ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in February, and the seeds ripen in March. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: Flowers StemEdible Uses: Leaf stalks - cooked and used like rhubarb[1, 2, 46, 116]. The stems can be up to 1.2 metres long[104]. They can be boiled and seasoned, pickled and used in winter soups or preserved in miso[183]. They can be boiled, dipped in cold water then peeled and baked - they have a pleasant fragrant taste[206]. Flower buds cooked or used as a flavouring[1, 22, 46, 61, 105]. A slightly bitter yet agreeable flavour[116, 206], they are much prized in Japan[183]. They can be eaten whilst still green with miso or boiled down in soy sauce[183]. The young flowering stems can be eaten cooked[206].

tcanta MiscellanyThe leaves of the sub-species *P. japonicus giganteus* are used as umbrellas by Japanese children[187]. The leaf stalks can be used as walking sticks[206]. Plants can be grown as ground cover in damp shady places[206]. They are too invasive for most gardens and should only be used where they have plenty of room[208].

dwatta Antiasthmatic Antispasmodic Expectorant Miscellany PoulticeThe plant (though the exact part of the plant used is not specified) is antiasthmatic, antispasmodic, expectorant and poultice[147]. A decoction is used in the treatment of chronic coughing and pulmonary 'deficiency', laboured or difficult breathing and asthma, constant sputum formation and pulmonary tuberculosis[147].

nrakta E. Asia - China, Japan, Korea. Naturalized in Britain. ksacta Moist woods and thickets[58].

propta Seed - we have no information on this species but suggest sowing the seed in a cold frame as soon as it is ripe or in early spring. Only just cover the seed and do not allow the compost to dry out. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division succeeds at almost any time of the year. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Landscape Uses:Container, Ground cover, Massing, Woodland garden. Succeeds in ordinary garden soil[1],

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade, though it fruits less well in such a situation[200]. Closely related to *M. bacata*[1]. The fruit, which is freely produced in Britain[11], is a good wildlife food source, especially for birds[200]. Hybridizes freely with other members of this genus[200]. Plants in this genus are notably susceptible to honey fungus[200].

6.2.215 *Malus bracteata*

5 tlin 9 cyuc 2 kcaak 0 tcan 0 dwat 7 m hkuc hmimhtut cyutli tcup hwicli hrasljutnyikfrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Malus bracteata* is a deciduous Tree growing to 7 m (23ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105]. The fruit is about 3cm in diameter[200].

nrakta Southern N. America - Missouri to Florida. ksacta Bottoms, wooded slopes, thickets and clearings[43] in moist soil types and moisture levels[159].

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

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[1, 200]. The fruit is a good wildlife food source, especially for birds[200]. There is some confusion over the correct name of this species, [43] lists this name as a synonym of *M. coronaria lancifolia* whilst [200] treats it as a species in its own right. This species is closely related to *M. ioensis*[200]. It hybridizes freely with other members of the genus[200]. Plants in this genus are notably susceptible to honey fungus[200].

6.2.216 *Pseudocyonia sinensis*

Chinese Quince, Quince

5 tlin 8 cyuc 2 kcaak 0 tcan 1 dwat 6 m hkuc htut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Pseudocyonia sinensis* is a deciduous Tree growing to 6 m (19ft) by 6 m (19ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from April to May, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium

(loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - eaten as a sweetmeat, candied, preserved in syrup or made into a liqueur[46, 183]. The juice can also be mixed with ginger and made into a beverage[183]. The fruit is very large, up to 18cm long[105, 179].

tcanta Pot-pourri WoodThe fruits are very aromatic and are placed in a bowl to impart a delightful spicy scent to a room[46]. Wood - hard, dark red. Used for picture frames[174].

dwatta AntitussiveThe fruit is antitussive[174, 279]. It contains several medically active constituents including organic acids plus the flavonoids rutin and quercetin[279]. It is used in Korea to treat asthma, the common cold, sore throats, mastitis and tuberculosis[279].

nrakta E. Asia - China. ksacta Found at elevations around 1000 metres in Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hebei, Hubei, Jiangsu, Jiangxi, Shaanxi, Shandong and Zhejiang Provinces[266].

propta Seed - best sown in a cold frame as soon as it is ripe in the autumn[200]. Stored seed requires 3 months cold stratification and should be sown as early in the year as possible[113]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Layering.

nwatta Landscape Uses:Specimen. Requires a sunny position[1, 11], succeeding in any reasonably good soil that is well-drained but not dry[1, 200]. Trees are very hardy when grown in a continental climate with long hot summers but in the cooler climate of Britain where they do not always ripen their wood they are only reliably hardy to about -5°C[200]. They grow well on a south-facing wall[11, 200] and this is the only way to ensure that they fruit well in Britain[1]. A plant growing in a sunny position on the south side of tree cover at Kew was 3.5 metres tall in spring 1995 and looked healthy[K]. Occasionally cultivated, especially in China[46], for its edible fruit, there are some named varieties[183]. There is a disagreement over the correct name for this species, with some authorities using *Pseudocyonia sinensis*[11, 200] and others *Chaenomeles sinensis*[266]. Flowers are produced on year-old wood[200]. Special Features: Not North American native, Fragrant flowers, Attractive flowers or blooms.

6.2.217 *Crataegus heterophylla*

5 tlin 9 cyuc 2 kcaak 0 tcan 2 dwat 6 m hkuc hmimhtut cyutli hgattcuphja7n hwicli hrasljutnyikfrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Crataegus heterophylla* is a deciduous Tree growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[177]. The fruit can be used in making pies, preserves, etc, and can also be dried for later use. The fruit is up to 1.5cm in diameter[200]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it

drutta *Vitis flexuosa* is a deciduous Climber growing to 8 m (26ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to July, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by In-sects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

ksakta Edible Parts: Fruit Leaves SapEdible Uses: Fruit - raw or dried for winter use[105, 177]. The fruit is about 7mm in diameter[200] and is carried in bunches. Some forms of this plant have edible leaves[177] - it is unlikely that the leaves of any forms are poisonous, but perhaps some are more palatable than others[K]. Young leaves are wrapped around other foods and then baked, they impart a pleasant flavour. Young tendrils - raw or cooked. Sap - a sweet taste[178], it can be made into a drink[105, 177].

tcanta DyeA yellow dye is obtained from the fresh or dried leaves[168].

dwatta Restorative TonicThe fruit is restorative, strengthening and tonic[218]. The sap is used to restore youth and black hair[218]. The root is said to be warming to the sinews[218].

nrakta E. Asia - China, Japan, Korea. ksakta Woodlands in hills and mountains of C. and S. Japan[58, 200].

propta Seed - best sown in a cold frame as soon as it is ripe[K]. Six weeks cold stratification improves the germination rate, and so stored seed is best sown in a cold frame as soon as it is obtained. Germination should take place in the first spring, but sometimes takes another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant out in early summer. Cuttings of mature wood of the current seasons growth, December/January in a frame. These cuttings can be of wood 15 - 30cm long or they can be of short sections of the stem about 5cm long with just one bud at the top of the section. In this case a thin, narrow strip of the bark about 3cm long is removed from the bottom half of the side of the stem. This will encourage callusing and the formation of roots. Due to the size of these cuttings they need to be kept in a more protected environment than the longer cuttings. Layering.

nwatta Prefers a deep rich moist well-drained moderately fertile loam[1, 200]. Grows best in a calcareous soil[200]. Succeeds in sun or partial shade though a warm sunny position is required for the fruit to ripen[200]. A very ornamental plant[1], it climbs by means of tendrils[182]. Any pruning should be carried out in winter when the plants are dormant otherwise they bleed profusely[182, 200]. Plants in this genus are notably susceptible to honey fungus[200].

6.2.213 *Morus bombycis*

Kuwa

5 tlin 9 cyuc 2 kcaak 0 tcan 2 dwat 8 m hkuc hmimhtut cyutli tcup hwicli hrasjltuntyk hpa7tli flatprikliwis hpa7tmwatli fyif hjonli

drutta *Morus bombycis* is a deciduous Tree growing to 8 m (26ft) by 6 m (19ft). See above for USDA hardiness. It is hardy to UK zone 6. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

ksakta Edible Parts: FruitEdible Uses: Fruit - raw or used in preserves[183]. The fruit is about 1cm in diameter[266].

tcanta FibreThe bark fibers are used for making paper[266].

dwatta Diuretic PectoralThe root bark is diuretic and pectoral[147]. A decoction is used in the treatment of 'hot' pulmonary coughing, asthma, excessive sputum production, oedematous face and difficult urination[147].

nrakta E. Asia - Japan. ksakta Mountains all over Japan[58].

propta The seed germinates best if given 2 - 3 months cold stratification[80, 98]. Sow the seed as soon as it is ripe

if possible, otherwise in February in a cold frame. The seed usually germinates in the first spring, though it sometimes takes another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the cold frame for their first winter. Plant them out in late spring or early summer after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame. Plant out in spring. A good percentage take, though they sometimes fail to thrive[78, 113]. Cuttings of mature wood of the current season's growth, 25 - 30cm with a heel of 2 year old wood, autumn or early spring in a cold frame or a shady bed outside[78, 113, 200]. Bury the cuttings to threequarters of their depth. Layering in autumn[200].

nwatta Prefers a warm well-drained loamy soil in a sunny position[1, 11]. There is some doubt over the validity of this name. [183] lists it as a synonym of *M. alba stylosa* (which we list as a synonym of *M. australis*) whilst [200] lists it as a synonym of *M. alba*. A plant seen at Hilliers Arboretum, Hampshire at the end of October 1996 seemed to be quite distinct from *M. alba* - it was still clothed in the lush green growth of early summer and was also still making new growth[K]. According to the Flora of China, this name is only a synonym for *M. australis*[266], though we are maintaining it as a separate species for the time being because we have seen specimens growing at Hilliers Arboretum that appear to be distinct[K]. Mulberries have brittle roots and so need to be handled with care when planting them out[238]. Any pruning should only be carried out in the winter when the plant is fully dormant because mulberries bleed badly when cut[238]. Ideally prune only badly placed branches and dead wood[238]. Plants in this genus are notably resistant to honey fungus[200].

6.2.214 *Malus sikkimensis*

5 tlin 9 cyuc 2 kcaak 0 tcan 0 dwat 7 m hkuc hmimhtut cyutli tcup hwicli hrasjltuntykripr hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Malus sikkimensis* is a deciduous Tree growing to 7 m (23ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in May, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

ksakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177]. The fruit is up to 15mm in diameter[200] and is freely produced in Britain[11].

nrakta E. Asia - Himalayas from India to Sikkim and western China. ksakta Open forests on slopes, mixed forests in valleys at elevations of 2500 - 3000 metres in western China[266].

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

but prefers a deep fertile humus-rich soil that is permanently moist but not stagnant, succeeding in shade, semi-shade or full sun[200]. Requires a moist shady position[187]. Plants can be grown in quite coarse grass, which can be cut annually in the autumn[233]. A very invasive plant, too rampant for anything other than the wild garden[187, 200]. Its roots are very difficult to eradicate[200]. The sub-species *P. japonicus giganteus* has huge leaves up to 1.5 metres across on stems 2 metres tall[187]. It has a poorer flavour than the species type[206]. Sometimes cultivated in E. Asia as a food plant[1, 58]. Dioecious, male and female plants must be grown if seed is required. Special Features: Attractive foliage, Not North American native, Invasive, Wetlands plant, Flower characteristics are unknown. Petasites japonicus giganteus (Petasites japonicus subsp. giganteus F.Schmidt ex Kitam) is a larger version of Petasites japonicus commonly know as giant fuki. It can grow in similar hardiness zones to fuki but can grow in wetter conditions and tolerate more sun. It can grow to 5 ft (1.5m). The plant is heat tolerant in zones 9 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

6.2.168 *Mentha requienii*

Corsican Mint, Mint

5 tlin 9 cyuc 3 kcaak 3 tcan 2 dwat 0.1 m hkuc hmimhtut cyutli tcup hwicli hrasjltuntykripr hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Mentha requienii* is a PERENNIAL growing to 0.1 m (0ft 4in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

ksakta Edible Parts: LeavesEdible Uses: Condiment TeaLeaves - raw or cooked. A very strong peppermint-like aroma, it is used as a flavouring in salads, cooked foods and liqueurs[183]. A herb tea is made from the leaves.

tcanta Essential Repellent StrewingAn essential oil with a strong peppermint scent is obtained from the whole plant. Rats and mice intensely dislike the smell of mint. The plant was therefore used in homes as a strewing herb and has also been spread in granaries to keep the rodents off the grain[244]. An ornamental ground cover plant[183].

dwatta Antiseptic Carminative FebrifugeA tea made from the leaves of most mint species has traditionally been used in the treatment of fevers, headaches, digestive disorders and various minor ailments[222]. The leaves are harvested as the plant comes into flower and can be dried for later use[238]. The essential oil in the leaves is antiseptic, though it is toxic in large doses[222].

nrakta Europe - Mediterranean in Corsica, Sardinia and Italy. Occasionally naturalized in Britain. ksakta Not known propta Seed - sow spring in a cold frame. Germination is usually fairly quick. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. Mentha species are very prone to hybridisation and so the seed cannot be relied on to breed true. Even without hybridisation, seedlings will not be uniform and

so the content of medicinal oils etc will vary. When growing plants with a particular aroma it is best to propagate them by division[K]. Division can be easily carried out at almost any time of the year, though it is probably best done in the spring or autumn to allow the plant to establish more quickly. Virtually any part of the root is capable of growing into a new plant. Larger divisions can be planted out direct into their permanent positions. However, for maximum increase it is possible to divide the roots up into sections no more than 3cm long and pot these up in light shade in a cold frame. They will quickly become established and can be planted out in the summer.

nwatta Reaching only 1-3 cm in height. Succeeds in most soils and situations so long as the soil is not too dry[200]. This species of mint will grow in drier soils than the other mints[245]. It also grows well in heavy clay soils. A sunny position is best for production of essential oils, but it also succeeds in partial shade. Prefers a shady position[188]. Fairly tolerant of being walked on, it grows well in the cracks of paving stones and also as a lawn with thyme and camomile[245]. This species is not hardy in all areas of Britain[238]. However, the plant usually self-sows even when the parent plant is killed by frost[238]. The whole plant is strongly aromatic with a peppermint aroma[245]. The flowers are very attractive to bees and butterflies. A good companion plant for growing near cabbages and tomatoes, helping to keep them free of insect pests. Members of this genus are rarely if ever troubled by browsing deer[233]. The plant is heat tolerant in zones 9 through 6. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A clumping mat former. Forming a dense prostrate carpet with a limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2].

6.2.169 *Sinapis alba*

White Mustard

5 tlin 9 cyuc 3 kcaak 0 tcan 3 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hrasjltuntyk hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Sinapis alba* is a ANNUAL growing to 0.6 m (2ft) by 0.3 m (1ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from June to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The seed contains substances that irritate the skin and mucous membranes[238]. The plant is possibly poisonous once the seedpods have formed[76]. Mustard allergy possibly especially in children and adolescents. Retention of seeds possibly in intestines if taken internally [301].

ksakta Edible Parts: Leaves Oil SeedEdible Uses: Condiment OilLeaves - raw or cooked[2, 5, 14, 52]. A hot pungent flavour, especially if eaten raw[K]. Young leaves are used as a flavouring in mixed salads, whilst older leaves are used as a potherb[183]. Seed - sprouted and eaten raw[1, 34, 37, 52]. The seed takes about 4 days to be ready[244]. A hot flavour, it is often used in salads. A nutritional analysis is available[218]. The seed can be ground into a powder and used as a food flavouring[17, 34, 89, 171], it is the 'white mustard' of commerce[100, 105]. This is milder than the black mustard obtained from *Brassica nigra*[183]. The pungency of mustard develops when cold water is added to the ground-up seed - an enzyme (myrosin) acts on a glyco-

side (sinigrin) to produce a sulphur compound. The reaction takes 10 - 15 minutes. Mixing with hot water or vinegar, or adding salt, inhibits the enzyme and produces a mild bitter mustard[238].

tcanta Green manure OilThe seed contains up to 35% of a semi-drying oil[74]. It is used as a lubricant and for lighting etc[21, 46, 57, 61]. The plant can be grown as a green manure crop[17, 89]. It is very fast growing, producing a good bulk in just a few weeks from seed, but it is shallow rooted so does not do so well in dry periods[87]. It is also susceptible to all the diseases of the cabbage family such as club-root so is best avoided if this is likely to be a problem[17].

dwatta Antifungal Antirheumatic Appetizer Carminative Cathartic Diaphoretic Digestive Diuretic Emetic Expectorant Rubefacient Stimulant VesicantThe seed is antibacterial, antifungal, appetizer, carminative, diaphoretic, digestive, diuretic, emetic, expectorant, rubefacient and stimulant[14, 176, 218, 238]. The seed has a cathartic action due to hydrolytic liberation of hydrogen sulphide[218]. In China it is used in the treatment of coughs with profuse phlegm and tuberculosis, pleurisy[176]. The seed is seldom used internally as a medicine in the west[238]. Externally it is usually made into mustard plasters (using the ground seed), poultices or added to the bath water. It is used in the treatment of respiratory infections, arthritic joints, chilblains and skin eruptions etc[238]. At a ratio of 1:3, the seed has an inhibitory action on the growth of fungus[176]. Care should be exercised in using this remedy because the seed contains substances that are extremely irritant to the skin and mucous membranes[238]. The leaves are carminative[218].

nrakta Europe - Mediterranean. Naturalized in Britain[17]. ksacta A weed of arable and waste land, especially on calcareous soils[17].

propta Seed - sow in situ from early spring to late summer. Germination takes place in less than a week. The earlier sowings are for a seed crop, the later sowings are for edible leaves and green manure[82]. When sowing seed for use in mustard and cress, the seed is soaked for about 12 hours in warm water and then placed in a humid position. Traditionally, it is sown in a tray on a thin layer of soil, or on some moist blotting paper, and the tray is placed in a warm dark place for a few days to encourage rapid and rather etiolated growth. The seedlings can then be placed in a lighter position for a couple more days to turn green before being eaten. The mustard seed should be sown about 3 - 4 days later than the cress for them both to be ready at the same time[264].

nwatta Prefers a light well-drained soil[52]. Succeeds on most soils when growing in a sunny position[238]. For best production, it requires high nutrient soils with a high level of nitrogen, but it may be grown on a wide range of soils from light to heavy, growing best on relatively heavy sandy loamy soils[269]. It is not suited to very wet soils[269]. White mustard grows best where the annual precipitation varies from 35 to 179cm, annual temperature from 5.6 to 24.9°C and pH from 4.5 to 8.2[269]. White mustard is a quick-growing long-day annual which prefers temperate climates with some humidity. It is sometimes cultivated, both in the garden and commercially, for its edible seed[4, 183]. The plant can withstand high temperatures, but very hot days during flowering and ripening may reduce seed setting and lower quality of seed[269]. There are some named varieties[183]. It is a very fast growing plant, but requires plenty of moisture for optimum growth[87]. Seed yields are usually a bit less than 1 tonne per hectare, though experimental plantings have suggested that up to 8 tonnes per hectare is possible[269]. White mustard is sometimes also grown as a seed sprout, usually with cress seeds (*Lepidium sativum*) to supply mustard and cress. This is a mixture of the two types of sprouted seeds, used when about 7 - 10 days old[K]. The mustard seed should be sown three days before the cress seed[238]. The plant is not very deep rooted[87], it self-sows freely when in a suitable site[14].

6.2.170 Mahonia nervosa

Oregon Grape, Cascade barberry
5 tlin 9 cyuc 3 kcaak 3 tcan 2 dwat 0.6 m hkuc
pcimhmimhtut cyutli kyuctcup hwicli hyishrasljutnyikfrp
hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Mahonia nervosa is an evergreen Shrub growing to 0.6 m (2ft) by 1 m (3ft 3in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from February to April. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit - raw or cooked[2, 3, 101]. An acid flavour but it is rather nice raw, especially when added to muesli or porridge[K]. Unfortunately, there is relatively little flesh and a lot of seeds[K]. Too acid for most tastes but they are very good in jams, jellies, pies etc[183]. They can also be used to enhance the flavour of bland fruits or made into a refreshing lemon-flavoured drink[183]. The fruit is about 8mm in diameter[200]. Young tender leaves - cooked. Simmered in a small amount of water and eaten as a snack[183].

tcanta DyeA yellow dye is obtained from the inner bark of the stem and roots[98, 101, 257]. Dark green, violet and dark blue-purple dyes are obtained from the fruit[168]. A green dye is obtained from the leaves[168]. Plants can be grown as a ground cover, spaced about 30cm apart each way[208]. They are very slow to spread[208] and so will need weeding for their first few years after planting[K].

dwatta Antiarthritic Antibacterial Antitumor Blood tonic Dysentery Laxative TonicThe root is alterative and tonic[4]. It improves the digestion and absorption and is recommended in the treatment of psoriasis, syphilis and impure blood conditions[4, 257]. A decoction of the peeled and chopped root bark has been used as a wash in treating arthritis and as an eyewash for red itchy eyes[257]. The fruit is an excellent safe and gentle laxative[257]. Berberine, universally present in rhizomes of Mahonia species, has marked antibacterial effects[218] and is used as a bitter tonic[213]. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218]. The root and root bark are best harvested in the autumn[213].

nrakta North-western N. America. ksacta Light dry woods and rocky ledges[60, 67].

propta Seed - best sown as soon as it is ripe in a cold frame[78]. It usually germinates in the spring[K]. 'Green' seed (harvested when the embryo has fully developed but before the seed case has dried) should be sown as soon as it is harvested and germinates within 6 weeks[K]. Stored seed should be sown as soon as possible in late winter or spring. 3 weeks cold stratification will improve its germination, which should take place in 3 - 6 months at 10°C. Prick out the seedlings when they are large enough to handle and grow them on in a cold frame for at least their first winter. Plant them out in late spring or early summer. Division of suckers in spring[78]. Whilst they can be placed direct into their permanent positions, better results are achieved if they are potted up and placed in a frame until established[11]. Leaf cuttings in the autumn.

nwatta An easily grown plant, it thrives in any good garden soil[11, 200] but also succeeds in poor dry ones. Another report says that it is best on a lime-free soil[182]. Grows well in heavy clay soils. Prefers a sunny position[3] but succeeds in heavy woodland shade[K]. Hybridizes freely with other members of this genus. Plants are growing and fruiting well at Wakehurst Plant in Sussex, but they do not generally do well in Britain[11]. Resistant to honey fungus[88].

6.2.171 Barbarea verna

Land Cress, Early yellowrocket
5 tlin 9 cyuc 3 kcaak 0 tcan 0 dwat 0.3 m hkuc
pcimhmimhtut cyutli tcup hwicli hrasljutnyik hpa7tli flat-
prikliwis hpa7tmwatli fyifxre7t hjonli

drutta Barbarea verna is a BIENNIAL growing to 0.3 m (1ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from May to July, and the seeds ripen from June to August.

old sores and swellings[222, 257]. A cold infusion of the roots is used as drops for sore eyes[257].

nrakta South-eastern N. America - New York to Florida, east to Texas. ksacta Buffs, rich woods and river banks in deep moist soils[43].

propta Seed - best sown as soon as ripe in a cold frame. Stored seed requires 3 - 5 months of cold stratification. Germination usually takes place within 1 - 4 months at 20°C[134]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in a greenhouse for at least their first winter. Once the plants are 25cm or more tall, they can be planted out into their permanent positions, late spring or early summer being the best time to do this. Root cuttings 8cm long, December in a cold frame[11, 78]. Store the roots upside down in sand and pot up in March/April. High percentage[78]. Division of suckers in late winter[11]. Very easy, the suckers can be planted out direct into their permanent positions if required.

nwatta Landscape Uses:Border, Massing, Specimen, Woodland garden. Prefers a good deep loam and a semi-shady position[1]. Requires a sheltered position[1]. A fast-growing but short-lived tree in its native zone[229], this species is of little value in Britain[1]. It is generally a single-stemmed plant, often spreading freely by means of suckers[182, 229]. Plants make finer foliage when growing in rich soils but are generally healthier and longer-lived in a comparatively poor soil[11]. The young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. Special Features:North American native, Naturalizing, All or parts of this plant are poisonous, Attracts butterflies, Attractive flowers or blooms.

6.2.210 Vitis parvifolia

5 tlin 9 cyuc 2 kcaak 0 tcan 1 dwat 8 m hkuc
hmimhtut cyutli kyuctcup hwicli hrasljutnyik hpa7tli flat-
prikliwis hpa7tmwatli xre7t hjonli

drutta Vitis parvifolia is a deciduous Climber growing to 8 m (26ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to July, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: Drink-Fruit - raw or dried for winter use[105, 177]. The fruit is about 7mm in diameter[200] and is carried in bunches. Some forms of this plant have edible leaves[177] - it is unlikely that the leaves of any forms are poisonous, but perhaps some are more palatable than others[K]. Young leaves are wrapped around other foods and then baked, they impart a pleasant flavour. Young tendrils - raw or cooked. Sap - a sweet taste[178], it can be made into a drink[105, 177].

tcanta DyeA yellow dye is obtained from the fresh or dried leaves[168].

dwatta OphthalmicThe fruit is restorative, strengthening and tonic[218]. The sap is used to restore youth and black hair[218]. The root is said to be warming to the sinews[218]. nrakta E. Asia - China, Japan, Korea. ksacta Woodlands in hills and mountains of C. and S. Japan[58, 200].

propta Seed - best sown in a cold frame as soon as it is ripe[K]. Six weeks cold stratification improves the germination rate, and so stored seed is best sown in a cold frame as soon as it is obtained. Germination should take place in the first spring, but sometimes takes another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant out in early summer. Cuttings of mature wood of the current seasons growth, December/January in a frame. These cuttings can be of wood 15 - 30cm long or they can be of short sections of the stem about 5cm long with just one bud at the top of the section. In this case a thin, narrow strip of the bark about 3cm long is removed from the bottom half of the side of the stem. This will encourage callusing and the formation of roots. Due to the size of these cuttings they need to be kept in a more protected environment than the longer cuttings. Layering.

nwatta Prefers a deep rich moist well-drained moderately fertile loam[1, 200]. Grows best in a calcareous soil[200]. Succeeds in sun or partial shade though a warm sunny position is required for the fruit to ripen[200]. A very ornamental plant[1], it climbs by means of tendrils[182]. Any pruning should be carried out in winter when the plants are dormant otherwise they bleed profusely[182, 200]. Plants in this genus are notably susceptible to honey fungus[200].

6.2.211 Quercus libani

Lebanon Oak
5 tlin 9 cyuc 2 kcaak 0 tcan 2 dwat 8 m hkuc
hmimhtut cyutli kyuctcup hwicli jltunykfrp hpa7tli flatprikli-
wis hpa7tmwatli hjonli

drutta Quercus libani is a deciduous Tree growing to 8 m (26ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: CoffeeSeed - cooked. The seed is about 2.5cm in diameter[200], it can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed contains bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute.

tcanta Repellent TanninA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4].

dwatta Astringent DysenteryAny galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta W. Asia - Turkey, Iran, Iraq. ksacta Not known
propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Young plants tolerate reasonable levels of side shade[200]. Prefers warmer summers than are usually experienced in Britain[200]. The seed ripens in its second year[200] and is frequently produced in Britain[11]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200].

6.2.212 Vitis flexuosa

5 tlin 9 cyuc 2 kcaak 0 tcan 1 dwat 8 m hkuc
hmimhtut cyutli kyuctcup hwicli hrasljutnyik hpa7tli flat-
prikliwis hpa7tmwatli xre7t hjonli

of intermittent fevers, rheumatism, catarrh, pleurisy etc[4, 238, 254]. The juice of the fresh leaves has been successfully used in the treatment of jaundice[4]. The berries are violently emetic and purgative[4, 7]. They have been used in the treatment of dropsy and as a powder they have been used as an astringent to check bleeding[4]. The berries are toxic, especially to children, and should not be used medicinally except under professional supervision[254]. The root has been used as a diuretic, though there are more effective diuretics available[7]. The plant is used in Bach flower remedies - the keywords for prescribing it are 'Hatred', 'Envy', 'Jealousy' and 'Suspicion'[209].

nrakta Western and central Europe, including Britain, from Norway to Germany south to the Mediterranean. ksacta Found in most well-drained soils in scrub, hedges and woodland where it is often the dominant under-storey shrub[7].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. It can take 18 months to germinate. Stored seed generally requires two winters and a summer before it will germinate and should be sown as soon as possible in a cold frame. Scarification, followed by a warm stratification and then a cold stratification may speed up the germination time[78, 80]. The seedlings are rather slow-growing. Pot them up into individual pots when they are large enough to handle and grow them on in light shade in a cold frame for their first year. It is possible to plant them out into a nursery bed in late spring of the following year, but they should not be left here for more than two years since they do not like being transplanted. Alternatively, grow them on in their pots for a second season and then plant them out into their permanent positions in late spring or early summer. Give them a good mulch and some protection for their first winter outdoors. Cuttings of almost ripe wood with a heel, August in a shaded position in a cold frame. Leave for 12 months before potting up. Layering in October. Takes 2 years.

nwatta Succeeds in most soils, including peat, chalk, gravels, sand and shales[186], so long as they are not waterlogged, though wild plants are occasionally found in situations with standing winter water[186]. Grows well in heavy clay soils[186]. Established plants are fairly drought tolerant[186]. Dislikes dry soils according to one report[31] whilst another says that it succeeds in dry shade[188]. Tolerates a pH range from 3.5 to 7.2[186]. Succeeds in full sun or fairly dense shade[17, 28, 31], self-sown seedlings from woods and shady places making the most shade tolerant plants[28]. Tolerant of maritime exposure[75] though in such a situation it may lose some or all its leaves in the winter[186]. Plants require a minimum July temperature of 12°C for good fruit production[186]. They tolerate short periods in winter down to -15°C[184]. Severe frosts can kill whole branches, especially if they are open to the sky[186]. The young growth in spring can be damaged by late frosts. A very ornamental plant, there are many named varieties[182]. Flowers and fruits are formed on wood of the previous year's growth[229]. A good bee plant[108], the minute flowers are sweetly scented[245]. The fruit is a valuable winter food source for birds. Resents root disturbance, especially as the plants get older[11]. It is best to place the plants into their permanent positions as soon as possible, perhaps giving some winter protection for their first year or two[K]. Only move the plants in May or, preferably, in September[1]. Plants are quite slow growing, even when in good soils and situations[11, 75]. Trees are usually dioecious but hermaphrodite forms are available. Male and female plants must usually be grown if seed is required. Plants are capable of regenerating from the main stem both above and below ground level and, although the top may be killed in a fire, the plants will usually regrow from the base[186]. Rabbits are particularly fond of this species and will quickly remove the bark. This species is notably resistant to honey fungus[200]. Special Features: Attractive foliage, Not North American native, Naturalizing, Fragrant flowers, Inconspicuous flowers or blooms. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

6.2.208 *Pyrus regellii*

5 tlin 9 cyuc 2 kcaak 0 tcan 0 dwat 9 m hkuc hmimhtut cyutli hgatkuyctup hwicli hrasjlutnykfrp hpa7tli flatprikklwis hpa7tmwatli xre7t hjonli

drutta *Pyrus regellii* is a deciduous Tree growing to 9 m (29ft 6in). See above for USDA hardiness. It is hardy to UK zone 6. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[177]. The fruit is about 3cm in diameter[200].

tcanta RootstockUsed as a rootstock[74].

nrakta W. Asia - Turkestan. ksacta Dry stony slopes, rocks, sometimes in valleys on deeper moist soils, 1000 - 2000 metres[74].

propta Seed - best sown in a cold frame as soon as it is ripe in the autumn, it will then usually germinate in mid to late winter. Stored seed requires 8 - 10 weeks cold stratification at 1°C and should be sown as early in the year as possible[200]. Temperatures over 15 - 20°C induce a secondary dormancy in the seed[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for their first year. Plant them out in late spring or early summer of the following year.

nwatta Prefers a good well-drained loam in full sun[200]. Grows well in heavy clay soils. Tolerates light shade but does not fruit so well in such a position. Tolerates atmospheric pollution, excessive moisture and a range of soil types if they are moderately fertile[200]. Established plants are very drought resistant[74]. Plants are hardy to at least -15°C[200]. Cultivated for its edible fruit in China and Japan, there are many named varieties. A hybrid between this plant and *P. communis* culta is more suitable for warmer climates. The leaves are remarkably variable in shape[11]. Trees are used in the re-afforestation of arid areas[74].

6.2.209 *Aralia spinosa*

Hercule's Club, *Aralia spinosa*, American Angelica Tree, Hercules' Club, Devil's Walking Stick

5 tlin 9 cyuc 2 kcaak 0 tcan 2 dwat 9 m hkuc pcmhhmim cyutli tcup hwicli hyishrasjlutnyk hpa7tli flatprikklwis hpa7tmwatli xre7t hjonli

drutta *Aralia spinosa* is a deciduous Tree growing to 9 m (29ft 6in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from August to September, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

pcista Handling the roots can cause dermatitis in some people[222]. Large amounts of the berries are poisonous[222].

kcakta Edible Parts: LeavesEdible Uses: Young leaves - cooked[105, 177]. The leaves usually have a number of slender prickles, they must be gathered before the prickles harden[159] and are then chopped finely and used as a potherb[183].

tcanta WoodWood - close-grained, weak, light, soft, brittle[82, 227]. Of little economic value[229].

dwatta Alternative Analgesic Diaphoretic Ophthalmic Sialagogue StimulantAnalgesic[46, 61]. The bark, especially of the roots[82] is the part most commonly used medicinally, though other parts of the plant, including the fruit[82], also possess medicinal properties[4]. The fresh bark is strongly emetic, ophthalmic, purgative and sialagogue[4, 46, 61, 222, 257], when dried it is a stimulating alternative and is diaphoretic[82]. A tincture of the berries is used in the treatment of toothache and rheumatism[4, 222, 257]. A poultice of the roots is applied to boils, skin eruptions, varicose veins,

The species is hermaphrodite (has both male and female organs) and is pollinated by Flies, bees, beetles. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves Oil SeedEdible Uses: OilYoung leaves - raw, cooked or used as a seasoning[1, 2, 33, 37, 52]. A hot, spicy watercress flavour, they are delicious in salads[183, 244]. Leaves can be obtained throughout the year if autumn-sown plants are given a light protection in winter[1]. An edible oil is obtained from the seed[46, 52, 61, 183]. The seed can be sprouted and added to salads etc[183].

nrakta S.W. Europe. Naturalized in Britain[17]. ksacta Waste and cultivated ground.

propta Seed - sow spring to September in situ at 3-weekly intervals to provide a succession of leaves. Germination usually takes place within 2 - 3 weeks.

nwatta Succeeds in sun or shade in a moist well-drained soil,[200] growing well on a north facing wall[33, 52]. The summer crop is best if it is given some shade whilst the winter crop succeeds in sunny positions[1, 200]. Land cress is often cultivated as a salad plant, when it is usually treated as an annual[46]. It can supply leaves all year round from successional sowings[1]. In hot weather plants soon run to seed unless they are kept shaded and moist[183]. The leaves taste much hotter in the summer[K]. Plants usually self-sow freely when growing in a suitable position[K].

6.2.172 *Apium graveolens*

Wild Celery. Ajmod, Ajwain-ka-patta (Indian)

5 tlin 9 cyuc 3 kcaak 0 tcan 3 dwat 0.6 m hkuc hmim cyutli tcup hwicli hrasjlutnyk hpa7tli flatprikklwis hpa7tmwatli fyifxre7t hjonli

drutta *Apium graveolens* is a BIENNIAL growing to 0.6 m (2ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from June to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in saline soils. It can grow in semi-shade (light woodland). It prefers moist soil.

pcista If the plant is infected with the fungus *Sclerotinia sclerotiorum*, skin contact with the sap can cause dermatitis in sensitive people[65]. This is more likely to happen to Caucasians[218]. Allergic responses include anaphylaxis in sensitive individuals. Cross-allergenicity between celery, cucumber, carrot, watermelon and possibly apples. Avoid during pregnancy as emmenagogue, abortifacient and uterine stimulant activity reported [301].

kcakta Edible Parts: Leaves Root SeedEdible Uses: CondimentLeaves - raw or cooked[52, 105]. Mainly used as a flavouring in soups etc[5, 7, 9, 46]. They can be eaten raw but have a very strong flavour[52]. They are toxic if consumed in large amounts[238]. Seed - a flavouring. Used in small quantities to flavour soups and stews[238]. An essential oil from the seed is also used as a flavouring[46, 105]. Root - cooked[74].

tcanta EssentialThe growing plant is an insect repellent, it repels the cabbage white butterfly so is a good companion for brassicas[20].

dwatta Antianxiety Antirheumatic Aperient Appetizer Carminative Diuretic Emmenagogue Galactagogue Nervine Stimulant TonicWild celery has a long history of medicinal and food use. It is an aromatic bitter tonic herb that reduces blood pressure, relieves indigestion, stimulates the uterus and is anti-inflammatory[238]. The ripe seeds, herb and root are aperient, carminative, diuretic, emmenagogue, galactagogue, nervine, stimulant and tonic[4, 7, 21, 165]. Wild celery is said to be useful in cases of hysteria, promoting restfulness and sleep and diffusing through the system a mild sustaining influence[4]. The herb should not be prescribed for pregnant women[238]. Seeds purchased for cultivation purposes are often dressed with a fungicide, they should not be used for medicinal purposes[238]. The root is harvested in the autumn and can be used fresh or dried[238].

The whole plant is harvested when fruiting and is usually liquidized to extract the juice[238]. The seeds are harvested as they ripen and are dried for later use[238]. An essential oil obtained from the plant has a calming effect on the central nervous system. Some of its constituents have antispasmodic, sedative and anticonvulsant actions. It has been shown to be of value in treating high blood pressure[254]. A homeopathic remedy is made from the herb[9]. It is used in treating rheumatism and kidney complaints[9].

nrakta Central and southern Europe, including Britain, to temperate areas of Africa and Asia. ksacta Ditches, by rivers and in other damp locations, especially near the sea in salt marshes[9, 17, 100].

propta Seed - sow spring or autumn in situ. If seed is in short supply it can be sown in a cold frame in spring. The seed can harbour certain diseases of celery, it is usually treated by seed companies before being sold but if you save your own seed you should make sure that only seed from healthy plants is used[1].

nwatta Prefers a rich moist soil in sun or semi-shade[238], but with some shade in the summer[52]. It is tolerant of saline soils[238]. The plants are fairly hardy, though they can be damaged by hard frosts[238]. Wild celery is the parent of the cultivated celery (*A. graveolens dulce*) as well as celery leaf (*A. graveolens secalinum*) and celeriac (*A. graveolens rapaceum*). This entry only deals with the wild celery, the other plants are dealt with separately. A very aromatic plant, the aroma being most noticeable when the foliage is bruised. The growing plant is a good companion for leeks, tomatoes, French beans and brassicas[18].

6.2.173 *Osmorhiza chilensis*

5 tlin 9 cyuc 3 kcaak 0 tcan 0 dwat 0.8 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyk hpa7tli flatprikklwis hpa7tmwatli fyifxre7t hjonli

drutta *Osmorhiza chilensis* is a PERENNIAL growing to 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 6. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Root - raw or cooked. It is considered to be a delicacy[69].

nrakta N. America, S. America. ksacta Deciduous Nothofagus forests and moist shaded cliffs to 200 metres in S. Chile north to latitude 31°S[69].

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

nwatta Succeeds in any deep moisture-retentive soil in sun or dappled shade[200]. Plants are hardy to about -20°C[200]. Well suited to naturalistic plantings in a woodland or wild garden[200]. A sweetly aromatic plant[200].

6.2.174 *Galium odoratum*

Sweet Woodruff, Sweet-scented bedstraw, Bedstraw
5 tlin 9 cyuc 3 kcaak 3 tcan 3 dwat 0.2 m hkuc pcmihmim cyutli kyuctcup hwicli hrasjlutnyk hpa7tli frusflatprikklwisslip hpa7tmwatli fyifxre7t hjonli

drutta *Galium odoratum* is a PERENNIAL growing to 0.2 m (0ft 8in) by 0.5 m (1ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to July, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies, bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers dry or moist soil. It can tolerate atmospheric pollution.

kcakta Edible Parts: Flowers LeavesEdible Uses: Condi- ment Drink TeaLeaves - raw or cooked[62]. The leaves are coumarin-scented (like freshly mown hay), they are used as a flavouring in cooling drinks[2, 9, 27] and are also added to fruit salads etc[183, 200]. The leaves are soaked in white wine to make 'Maitrank', an aromatic tonic drink that is made in Alsace[238]. A fragrant and delicious tea is made from the green-dried leaves and flowers[2, 183, 268]. Slightly wilted leaves are used, the tea has a fresh, grassy flavour[200]. The sweet-scented flowers are eaten or used as a garnish[183].

tcanta Dye Pot-pourri Repellent StrewingA red dye is obtained from the root[168]. Soft-tan and grey-green dyes are obtained from the stems and leaves[168]. A good ground-cover plant for growing on woodland edges or in the cool shade of shrubs[24, 200]. It spreads rapidly at the roots[28, 197, 208]. It is an ideal carpeting plant for bulbs to grow through[K]. Although the fresh plant has very little aroma, as it dries it becomes very aromatic with the scent of newly-mown grass and then retains this aroma for years[2, 200]. It is used in the linen cupboard to protect from moths etc.[4, 14] It was also formerly used as a strewing herb and is an ingredient of pot-pourri[238]. It was also hung up in bunches in the home in order to keep the rooms cool and fragrant during the summertime[245].

dwatta Antispasmodic Cardiac Diaphoretic Diuretic Homeopathy SedativeSweet woodruff was widely used in herbal medicine during the Middle Ages, gaining a reputation as an external application to wounds and cuts and also taken internally in the treatment of digestive and liver problems[4]. In current day herbalism it is valued mainly for its tonic, diuretic and anti-inflammatory affect[254]. The leaves are antispasmodic, cardiac, diaphoretic, diuretic, sedative[9, 13, 21, 200]. An infusion is used in the treatment of insomnia and nervous tension, varicose veins, biliary obstruction, hepatitis and jaundice[9, 238]. The plant is harvested just before or as it comes into flower and can be dried for later use[9]. One report says that it should be used with caution[21] whilst another says that it is entirely safe[9]. Excessive doses can produce dizziness and symptoms of poisoning[268]. The dried plant contains coumarins and these act to prevent the clotting of blood - though in excessive doses it can cause internal bleeding[254]. The plant is grown commercially as a source of coumarin, used to make an anticoagulant drug[268]. Do not use this remedy if you are taking conventional medicine for circulatory problems or if you are pregnant[254]. Both Asperuloside (a terpenoid) and Coumarin (a benzopyrone) occur in some species of Galium. Asperuloside can be converted into prostaglandins (hormone-like compounds that stimulate the uterus and affect blood vessels), making the genus of great interest to the pharmaceutical industry[238]. A homeopathic remedy made from the plant is used in the treatment of inflammation of the uterus[238].

nrakta Northern and central Europe, including Britain, south and east to N. Africa and Siberia. ksacta Woodland and shady areas[4, 14] on damp calcareous and base rich soils[17]. Often found in beech woods[268].

propta Seed - best sown in situ as soon as it is ripe in late summer[200]. The seed can also be sown in spring though it may be very slow to germinate[200]. A period of cold stratification helps reduce the germination time. Lots of leafmold in the soil and the shade of trees also improves germination rates. Division in spring. The plant can also be successfully divided throughout the growing season if the divisions are kept moist until they are established[200]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring. Cuttings of soft wood, after flowering, in a frame.

nwatta Landscape Uses:Ground cover, Massing, Rock garden, Woodland garden. Prefers a loose moist leafy soil in some shade[200]. Tolerates dry soils but the leaves quickly become scorched when growing in full sun[200]. This species does not thrive in a hot climate[200]. Prefers a moist calcareous soil[9, 13, 14]. Dislikes very acid soils[187]. Tolerates a pH in the range 4.3 to 8.3. This species is very tolerant of atmospheric pollution and grows well in towns[208]. A very cold-hardy plant, tolerating temperatures down to about -25°C[187]. Sweet woodruff is occasionally cultivated in the herb garden for its medicinal and other uses. The dried foliage has the sweet scent of newly mown hay[245]. A very

ornamental plant[1] but it spreads rapidly[28] and can be invasive[200]. However, this is rarely to the detriment of other plants since these are normally able to grow through it[200]. It does no harm to any plants more than 60cm tall[208]. Special Features: Attractive foliage, Edible, Fragrant foliage, Not North American native, Naturalizing, Suitable for dried flowers, Fragrant flowers. The plant is heat tolerant in zones 8 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [2-1].

6.2.175 Cirsium foliosum

Elk thistle

5 tlin 9 cyuc 3 kcaak 2 tcan 0 dwat 0.6 m hkuc htut cyutli tucphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwattli fyfxre7t hjonli

drutta Cirsium foliosum is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies), beetles. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist or wet soil.

kcakta Edible Parts: Leaves Oil Root StemEdible Uses: OilRoot - cooked[61, 85, 105, 161]. About the size of a carrot, they are sweet and well-flavoured though require long preparation[207]. The root is likely to be rich in inulin, a starch that cannot be digested by humans. This starch thus passes straight through the digestive system and, in some people, ferments to produce flatulence[K]. Plant crown[85]. No more details are given. Stems - peeled[161]. The peeled stems are a sweet potherb[207]. Tender with a sweet delicate taste[212].

tcanta OilThe seed of all species of thistles yields a good oil by expression[4]. No details of potential yields etc are given[K].

nrakta N. America - Montana to Saskatchewan. ksacta Swales and other moderately moist and badly drained sites[60]

propta Seed - sow early spring or autumn in situ. Germination usually takes place within 2 - 8 weeks at 20°C[164]. Division in spring or autumn.

nwatta An easily grown plant, succeeding in any ordinary garden soil in a sunny position[200]. This species should tolerate wet soils[K].

6.2.176 Tanacetum balsamita

Alecost, Costmary

5 tlin 9 cyuc 3 kcaak 0 tcan 2 dwat 0.9 m hkuc hmimhtut cyutli kyuctup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwattli xre7t hjonli

drutta Tanacetum balsamita is a PERENNIAL growing to 0.9 m (3ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

climb by means of tendrils[182]. Any pruning should be carried out in winter when the plants are dormant, otherwise they bleed profusely[182, 200]. This species is closely related to *V. rupestris*[43]. Plants in this genus are notably susceptible to honey fungus[200].

6.2.205 Koelreuteria paniculata

Golden Rain Tree, Varnish Tree

5 tlin 8 cyuc 2 kcaak 0 tcan 1 dwat 10 m hkuc htut cyutli kyuctup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwattli xre7t hjonli

drutta Koelreuteria paniculata is a deciduous Tree growing to 10 m (32ft) by 10 m (32ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from July to August, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: Leaves SeedEdible Uses: Berries - roasted[2, 177]. Leaves and young shoots - cooked[2, 105, 177, 179].

tcanta Beads DyeA yellow dye is obtained from the flowers.[46, 61, 178]. A black dye is obtained from the leaves[178]. The seeds are used as beads in necklaces etc[46, 61, 178].

dwatta OphthalmicThe flowers are ophthalmic[178, 218]. They are used in the treatment of conjunctivitis and epiphora[218].

nrakta E. Asia - N. China. Naturalized in Japan and S. Europe. ksacta Found by sea-shores in Japan[58]. Grows on plains and in secondary forest on poor soils in China[200].

propta The seed requires a period of cold stratification. It is probably best sown as soon as it is ripe in a cold frame[200]. Pre-soak stored seed for 24 hours in warm water. If it swells up then sow it in a cold frame. If it does not swell then soak it for a further 24 hours in hot water prior to sowing. This should cause the seed to swell but, should this fail, scarification (taking care not to damage the seed embryo) followed by a further 24 hours in warm water should do the trick[80]. Germination is usually good[78], though the seedlings are very variable[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Consider giving the plants some protection from the cold for their first winter outdoors[78]. Root cuttings, 4cm taken in December. Plant horizontally in individual pots in a warm greenhouse[78].

nwatta Landscape Uses:Pest tolerant, Specimen. Succeeds in any good loamy soil[1, 11] and in dry soils. Prefers a sunny sheltered position[1, 11]. A wind resistant plant, but it does not like salt-laden winds[200]. Tolerates atmospheric pollution[200]. This species is hardy to about -10°C when fully dormant[200], though the young growth in spring can be damaged by late frosts. Grows best in areas with long hot summers, it is fast growing in such conditions[200]. A short-lived tree[11]. A good bee plant[108]. Plants are susceptible to coral spot fungus, especially if the wood is not properly ripened due to insufficient summer heat[11]. This species is notably resistant to honey fungus[200]. Special Features: Not North American native, Blooms are very showy.

6.2.206 Pyrus amygdaliformis

5 tlin 9 cyuc 2 kcaak 0 tcan 0 dwat 10 m hkuc hmimhtut cyutli hgattcup hwicli hrasjlutnyikfrp hpa7tli flatpriklwis hpa7tmwattli xre7t hjonli

drutta Pyrus amygdaliformis is a deciduous Tree growing to 10 m (32ft) by 8 m (26ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained

soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[177]. The fruit is up to 3cm in diameter[200].

nrakta S. Europe to W. Asia. ksacta Dry rocky places in Bulgaria and the Mediterranean[50].

propta Seed - best sown in a cold frame as soon as it is ripe in the autumn, it will then usually germinate in mid to late winter. Stored seed requires 8 - 10 weeks cold stratification at 1 °c and should be sown as early in the year as possible[200]. Temperatures over 15 - 20°C induce a secondary dormancy in the seed[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for their first year. Plant them out in late spring or early summer of the following year.

nwatta Prefers a good well-drained loam in full sun[200]. Grows well in heavy clay soils. Tolerates light shade but does not fruit so well in such a position. Tolerates atmospheric pollution, excessive moisture and a range of soil types if they are moderately fertile[200]. Established plants are drought tolerant[200]. Plants are hardy to at least -15°C[200].

6.2.207 Ilex aquifolium

Holly, English holl, Christmas Holly, Common Holly, English Holly

5 tlin 9 cyuc 2 kcaak 4 tcan 2 dwat 9 m hkuc pcmhmmhtut cyutli hgatkuyuctup hwicli hyishrasjlutnyikfrp hpa7tli frusflatpriklwis hpa7tmwattli nyanhjen hjonli

drutta Ilex aquifolium is an evergreen Shrub growing to 9 m (29ft) by 5 m (16ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf all year; in flower from May to June, and the seeds ripen from November to March. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Bees. The plant is not self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure. It can tolerate atmospheric pollution.

pcista The fruit and probably other parts of the plant contain saponins and are toxic, causing diarrhoea, vomiting and stupor[10, 274]. However, toxicity levels are low and it is only in very large doses that problems are likely to arise[65, 76]. Do not exceed recommended doses. Fruits particularly poisonous to children [301].

kcakta Edible Parts: Edible Uses: TeaThe leaves have been used as a tea substitute[4]. The roasted fruit has been used as a coffee substitute[7]. Some caution is advised here, since the fruit can be purgative and emetic[K].

tcanta Fuel Hedge Hedge WoodAn excellent hedge plant, tolerating hard clipping and maritime exposure and forming a dense stock-proof shelter[4, 11, 29, 75, 186]. Plants are fairly slow growing however[11]. The cultivar 'Pendula' makes a very good carpeting ground cover plant when grown as a cutting on its own roots[208]. It can be planted up to 1.2 metres apart each way, but is fairly slow to cover the ground[208]. Wood - strong, hard and dense, it polishes well, though it must be well dried and seasoned or else it warps badly. It is beautifully white, except at the centre of very old trees, and is highly regarded by cabinet makers though it must be well seasoned[4, 7, 46, 61]. The heartwood of mature trees is used for printing blocks, engravings, turnery etc[11, 115]. The wood makes a good fuel, burning well even when green[6]. Landscape Uses:Border, Screen, Standard, Specimen.

dwatta Astringent Bach Diaphoretic Diuretic Emetic Expectorant Febrifuge PurgativeHolly is little used in modern herbalism. The leaves are diaphoretic, expectorant, febrifuge and tonic[4, 9, 21]. They can be use fresh at almost any time of the year or can be harvested in late spring and dried for later use[4, 9]. They are used in the treatment

C. buckleyi Dewey. Is a synonym for *C. brunnescens* subsp. *Sphaerostachya*, whilst *C. buckleyi* Durand. Is a synonym for *C. texana*[270]. Trees are self-fertile but larger crops of better quality seeds are produced if cross-pollination takes place[229].

6.2.202 Sorbus austriaca

5 tlin 9 cyuc 2 kcaak 0 tcan 0 dwat 10 m hku hmihtut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikwis hpa7tmwatli xre7t hjonli

drutta *Sorbus austriaca* is a deciduous Tree growing to 10 m (32ft 10in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from May to June, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

pcista The seeds probably contain hydrogen cyanide. This is the ingredient that gives almonds their characteristic flavour. Unless the seed is very bitter it should be perfectly safe in reasonable quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked in preserves etc[K]. Rather mealy but a pleasant semi-sweet flavour when fully ripe[K]. The fruits are about 13mm across[200] and are borne in fairly large bunches making harvesting easy[K].

nrakta Europe - Switzerland to Austria and Hungary. ks-acta Not known

propta Seed - best sown as soon as it is ripe in a cold frame[78, 80]. If you have sufficient seed it can be sown in an outdoor seedbed[78, 80]. Stored seed germinates better if given 2 weeks warm then 14 - 16 weeks cold stratification[98], so sow it as early in the year as possible. Prick out the seedlings into individual pots when they are large enough to handle. Seedlings are very slow to put on top-growth for their first year or two[11], but they are busy building up a good root system. It is best to keep them in pots in a cold frame for their first winter and then plant them out into their permanent positions in late spring.

nwatta Succeeds in most reasonably good soils in an open sunny position[11]. Tolerates light shade[188], though it fruits better in a sunny position[K]. This species is closely related to *S. intermedia*[200]. Plants are susceptible to fire-blight[188]. Trees seen at Wisley and at Cambridge Botanical Gardens in September 1993 were bearing very good crops of fruit[K]. The name of this species might have been mis-spelt, it could be *S. austriaca*[200].

6.2.203 Vitis romanetii

5 tlin 9 cyuc 2 kcaak 0 tcan 0 dwat 10 m hku htut cyutli kyuctcup hwicli hrasljutnyik hpa7tli flatprikwis hpa7tmwatli xre7t hjonli

drutta *Vitis romanetii* is a deciduous Climber growing to 10 m (32ft 10in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from June to July, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit - raw or dried for winter use[105, 177]. The fruit is about 8 - 12mm in diameter[200] and is borne in small bunches. Young leaves are wrapped around other foods and then baked, they impart a pleasant flavour. Young tendrils - raw or cooked.

tcanta DyeA yellow dye is obtained from the fresh or dried leaves[168].

nrakta E. Asia - China. ksacta Thickets, 900 - 1200 metres in W. China.

propta Seed - best sown in a cold frame as soon as it is ripe[K]. Six weeks cold stratification improves the germination rate, and so stored seed is best sown in a cold frame as soon as it is obtained. Germination should take place in the first spring, but sometimes takes another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant out in early summer. Cuttings of mature wood of the current seasons growth, December/January in a frame. These cuttings can be of wood 15 - 30cm long or they can be of short sections of the stem about 5cm long with just one bud at the top of the section. In this case a thin, narrow strip of the bark about 3cm long is removed from the bottom half of the side of the stem. This will encourage callusing and the formation of roots. Due to the size of these cuttings they need to be kept in a more protected environment than the longer cuttings. Layering.

nwatta Prefers a deep rich moist well-drained moderately fertile loam[1, 200]. Grows best in a calcareous soil[200]. Requires a position in full sun[200]. This species is not hardy in the colder areas of the country[219]. Young growths and thin wood can be cut back by frosts[219]. Plants climb by means of tendrils[182]. Closely related to *V. davidii*[219]. Plants are rather tender in Britain when they are young, though older plants are hardy in most parts of the country[11]. Any pruning should be carried out in winter when the plants are dormant otherwise they bleed profusely[182, 200]. Plants in this genus are notably susceptible to honey fungus[200].

6.2.204 Vitis acerifolia

Bush Grape, Mapleleaf grape

5 tlin 9 cyuc 2 kcaak 0 tcan 0 dwat 10 m hku hmihtut cyutli kyuctcup hwicli hrasljutnyik hpa7tli flatprikwis hpa7tmwatli xre7t hjonli

drutta *Vitis acerifolia* is a deciduous Climber growing to 10 m (32ft 10in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to July, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit - raw or dried for winter use. A sweet flavour[177]. The fruit is about 16mm in diameter[200]. Young leaves are wrapped around other foods and then baked, they impart a pleasant flavour. Young tendrils - raw or cooked.

tcanta DyeA yellow dye is obtained from the fresh or dried leaves[168].

nrakta Southern N. America - Texas to Kansas and Colorado. ksacta Ravines and sandy shores[43]. Stream bottoms and rocky slopes in Texas, usually scrambling over rocks and shrubs[274].

propta Seed - best sown in a cold frame as soon as it is ripe[K]. Six weeks cold stratification improves the germination rate, and so stored seed is best sown in a cold frame as soon as it is obtained. Germination should take place in the first spring, but sometimes takes another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant out in early summer. Cuttings of mature wood of the current seasons growth, December/January in a frame. These cuttings can be of wood 15 - 30cm long or they can be of short sections of the stem about 5cm long with just one bud at the top of the section. In this case a thin, narrow strip of the bark about 3cm long is removed from the bottom half of the side of the stem. This will encourage callusing and the formation of roots. Due to the size of these cuttings they need to be kept in a more protected environment than the longer cuttings. Layering.

nwatta Prefers a deep rich moist well-drained moderately fertile loam[1, 200]. Grows best in a calcareous soil[200]. Succeeds in sun or partial shade though a warm sunny position is required for the fruit to ripen[200]. Plants

kcakta Edible Parts: LeavesEdible Uses: Condiment TeaLeaves - raw or used as a flavouring in soups, beer etc[2, 4, 14, 27, 52, 177, 183]. They can be chopped and added sparingly to salads[183]. They have a very pleasant aroma, but can be overpowering in the food if you are not careful[K]. The leaves were at one time widely used in brewing beer, before being superseded by hops (*Humulus lupulus*)[238]. The whole leaves can be laid in cake trays to flavour the cake whilst it is baking[183]. The flower petals are used for whistler[183]. A delicious tea is made from the dried leaves[14, 21, 183].

tcanta Insecticide Pot-pourri StrewingThe plant was traditionally used for its insecticidal properties[200]. The dried leaves retain their fragrance well and so are used in pot-pourri[4, 238], they are also used as a strewing herb[200].

dwatta Antiseptic Astringent Digestive Dysentery LaxativeAlecost is seldom used in herbal medicine, though it does have a beneficial effect upon the digestive system[268]. The leaves are antiseptic, astringent, digestive and laxative[4, 14, 238]. They have been used internally as an aperient in the treatment of dysentery, and as a remedy for liver and gall bladder complaints[238]. Externally, they have been used as a salve to treat burns and insect stings[238, 268]. They are considered to be virtually obsolete in modern herbalism[4, 238].

nrakta Europe to W. Asia. ksacta An introduced weed of roadsides in eastern N. America[43].

propta The seed is seldom produced in Britain[4]. If seed is obtained it would probably be best sown in a cold frame in early spring. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring or autumn[4]. Very easy, it can be done successfully at almost any time of the year. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring. Basal cuttings in late spring[K]. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta An easily grown plant, it prefers a sunny warm position[52] in a dry soil[14, 37] but thrives under most conditions[4]. Tolerates a pH in the range 5.0 to 7.6. The leaves emit a soft balsamic odour[4]. The sub-species *T. balsamita tomentosus* is called the camphor plant because of its camphor-scented foliage[238]. Plants produce lots of leaves but no flowers when grown in the shade[4], though this is an advantage when the plant is being grown for its useful leaves[200]. Alecost used to be commonly grown in the herb garden but it has fallen out of favour in recent times[4].

6.2.177 Geum urbanum

Wood Avens, Bennet's Root - Old man's whiskers, Herb ben-net

5 tlin 9 cyuc 3 kcaak 2 tcan 3 dwat 0.5 m hku hmihtut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikwis hpa7tmwatli fyixre7t hjonli

drutta *Geum urbanum* is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves RootEdible Uses: Condiment DrinkYoung leaves - cooked. Root - cooked. Used as a spice in soups, stews etc, and also as a flavouring in ale[4, 5, 8, 13, 183]. It is a substitute for cloves with a hint of cinnamon in the flavour[12, 74, 183]. It is best used in spring[12]. The root is also boiled to make a beverage[161]. The root is up to 5cm long[4].

tcanta Repellent TanninThe freshly dug root has a clove-like fragrance[4], when dried it is used in the linen cupboard to repel moths[4, 53]. The root contains about 9% tannin[4].

dwatta Antidiarrhoeal Antiinflammatory Antiseptic Aromatic Astringent Diaphoretic Febrifuge Skin Stomachic Styptic TonicWood avens is an astringent herb, used principally to treat problems affecting the mouth, throat and gastrointestinal tract. It tightens up soft gums, heals mouth ulcers, makes a good gargle for infections of the pharynx and larynx, and reduces irritation of the stomach and gut[254]. All parts of the plant, but especially the root, are anti-inflammatory, antiseptic, aromatic, astringent, diaphoretic, febrifuge, stomachic, styptic and tonic[4, 9, 21, 165, 238]. An infusion is taken internally in the treatment of diarrhoea, intestinal disorders, stomach upsets, irritable bowel syndrome and liver disorders, it is also applied externally as a wash to haemorrhoids, vaginal discharges etc[238, 254] and to treat various skin afflictions - it is said to remove spots, freckles and eruptions from the face[4, 9]. The root is best harvested in the spring, since at this time it is most fragrant[4]. Much of the fragrance can be lost on drying, so the root should be dried with great care then stored in a cool dry place in an airtight container, being sliced and powdered only when required for use[4]. The powdered root had a great reputation as a substitute for quinine in the treatment of intermittent fevers [301].

nrakta Europe, including Britain, from Norway south and east to N. Africa, Siberia, Himalayas and W. Asia. ks-acta Woods, scrub, hedge banks, walls etc, usually on good damp soils[9, 13, 17].

propta Seed - sow spring or autumn in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer' Division in spring or autumn. This should be done every 3 - 4 years in order to maintain the vigour of the plant[200]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Easily grown in any moderately good garden soil that is well-drained[1]. Prefers shade[12, 21] and a soil rich in organic matter[200]. This species was widely cultivated as a pot-herb in the 16th century[5]. The bruised or dried root is pleasantly aromatic with a clove-like fragrance[245]. Plants self-sow freely when well-sited[238]. Hybridizes freely with other members of this genus[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

6.2.178 Quercus petraea

Sessile Oak, Durmast oak

5 tlin 8 cyuc 2 kcaak 0 tcan 3 dwat 40 m hku hmihtut cyutli tcuphja7n hwicli jlutnyikfrip hpa7tli frusflatprikwis hpa7tmwatli hjonli

drutta *Quercus petraea* is a deciduous Tree growing to 40 m (131ft) by 25 m (82ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from April to May, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. It is noted for attractive wildlife. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil. The plant can tolerate strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: Coffee GumSeed - cooked[2, 5, 8, 13]. It can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed contains bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in

a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute[21, 61]. An edible gum is obtained from the bark[177].

tcanta Basketry Charcoal Compost Fuel Gum Ink Repellent Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20, 201]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. The bark is an ingredient of 'Quick Return' herbal compost activator[32]. This is a dried and powdered mixture of several herbs that can be added to a compost heap in order to speed up bacterial activity and thus shorten the time needed to make the compost[K]. The bark is very rich in calcium[13]. An ink is made from the oak galls, mixed with salts of iron[7, 66]. The wood is a source of tar, quaiacol, acetic acid, creosote and tannin[123]. Tannin is extracted commercially from the bark and is also found in the leaves[223]. Wood - hard, tough, durable even under water. It is highly valued for furniture, construction etc[4, 13, 66]. It is also a good fuel and charcoal[6, 61]. Trees can be coppiced to provide material for basket making, fuel, construction etc[23].

dwatta Antiseptic Astringent Bach Decongestant Dysentery Haemostatic TonicThe oak tree has a long history of medicinal use. It is anti-inflammatory, antiseptic, astringent, decongestant, haemostatic and tonic[4, 7, 9, 13, 21, 165]. The bark is the part of the plant that is most commonly used[4], though other parts such as the galls, seeds and seed cups are also sometimes used[7]. A decoction of the bark is useful in the treatment of chronic diarrhoea, dysentery, intermittent fevers, haemorrhages etc[4]. Externally, it is used to bathe wounds, skin eruptions, sweaty feet, piles etc[9]. It is also used as a vaginal douche for genital inflammations and discharge, and also as a wash for throat and mouth infections[9]. The bark is harvested from branches 5 - 12 years old, and is dried for later use[9]. Any galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4]. The plant is used in Bach flower remedies - the keywords for prescribing it are 'Despondency', 'Despair, but never ceasing effort'[209]. A homeopathic remedy is made from the bark. It is used in the treatment of disorders of the spleen and gall bladder[9].

nrakta Europe, including Britain, from Norway south and east to Spain, S.W. Russia and Greece. ksacta Woods, especially on acid soils and in the western part of Britain, where it is often dominant[17].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Landscape Uses:Specimen, Street tree. Prefers a good deep fertile loam which can be on the stiff side[11]. Dislikes heavy clay[98]. Young plants tolerate reasonable levels of side shade[200]. Found mainly on acid soils in the wild. Thrives in well drained soils but is also tolerant of periodic flooding[186]. Tolerates exposure and strong winds if these are not salt-laden[186]. A very important timber tree in Britain, it is also a food plant for the caterpillars of many species of butterfly[30], there are 284 insect species associated with this tree[24]. Trees were often coppiced or polarded in the past for their wood[186], though this is best done on a long rotation of perhaps 50 years. The tree flowers on new growth produced in spring, the seed ripening in its first year[200, 229]. Older trees have a thick corky bark and this can protect them from forest fires, young trees will often regenerate from the base if cut down or killed back by a fire[186]. Trees transplant badly unless moved regularly[11].

Hybridizes freely with other members of the genus[200]. Immune to attacks by the Tortix moth[1]. This species is notably resistant to honey fungus[88, 200]. Special Features:Not North American native, inconspicuous flowers or blooms.

6.2.179 Fraxinus excelsior

Ash, European ash, Common Ash
5 tlin 8 cyuc 2 kcaak 3 tcan 2 dwat 30 m hkuc
htut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli frusflatprikwis hpa7tmwatti nyanhjen hjonli

drutta Fraxinus excelsior is a deciduous Tree growing to 30 m (98ft) by 20 m (65ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in leaf from May to October, in flower from April to May, and the seeds ripen from September to January. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It cannot grow in the shade. It prefers moist or wet soil. The plant can tolerate maritime exposure. It can tolerate atmospheric pollution.

pcista Poisonous to ruminants[76], it has also caused dermatitis in some people[76].

kcakta Edible Parts: Manna Oil SeedEdible Uses: Oil TeaImmature seed - usually pickled by steeping in salt and vinegar, and then used as a condiment for other foods[2, 8, 66, 183]. The leaves are sometimes used as an adulterant for tea[2, 177, 183]. A manna is obtained from the tree[183]. No further details are given. An edible oil similar to sunflower (Helianthus annuus) oil is obtained from the seed[7].

tcanta Dye Fuel Oil Shelterbelt String Tannin WoodA green dye is obtained from the leaves[7]. The bark is a source of tannin[4]. A tying material can be obtained from the wood[6] (does this mean the bark?). Very tolerant of extreme exposure and relatively fast growing, though often windshaped in exposed positions, it can be grown as a shelterbelt tree[49, 200]. However, it is late coming into leaf and also one of the first trees to lose its leaves in the autumn and this makes it less suitable in a shelter belt. Wood - hard, light, flexible, strong, resilient. A very valuable wood, it is much used for tool handles, oars, furniture, posts etc[4, 6, 7, 13, 46, 66]. An excellent fuel, burning well even when green[6]. There is some doubt over how well the green wood burns with several people claiming that it needs to be properly seasoned[K].

dwatta Antiperiodic Astringent Carminative Cathartic Diaphoretic Diuretic Laxative Purgative TonicThe leaves are astringent, cathartic, diaphoretic, mildly diuretic, laxative and purgative[4, 7, 9, 13, 21, 165, 254]. The have been used as a laxative, making a mild substitute for senna pods[254]. The leaves should be gathered in June, well dried and stored in airtight containers[4]. The bark is antiperiodic, astringent and a bitter tonic[4, 240]. Little used in modern herbalism, it is occasionally taken in the treatment of fevers[254]. The seeds, including their wings, have been used as a carminative[4]. They will store for 12 months if gathered when ripe[4].

nrakta Europe, including Britain south of latitude 64°, to N. Africa and W. Asia. ksacta Forming woods on calcareous soils in the wetter parts of Britain, also in oakwoods, scrub, hedges etc[17]. It is also often found on acid soils[17].

propta The seed is best harvested green - as soon as it is fully developed but before it has fully dried on the tree - and can then be sown immediately in a cold frame[80]. It usually germinates in the spring[80]. Stored seed requires a period of cold stratification and is best sown as soon as possible in a cold frame[200]. Approximately 5% of stored seed will germinate in the first year, the remainder germinating in the second year[186]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant them out into their permanent positions or a nursery bed in late spring or early summer of the following year. If you have sufficient seed then it is possible to sow it directly into an outdoor seedbed, preferably in the autumn. Grow the seedlings on in the seedbed for 2 years before transplanting either to

pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105]. Gritty[1]. The fruit is 10 - 15mm in diameter[200].

nrakta E. Asia - China. ksacta Mixed forests on slopes at elevations of 1400 - 3500 metres in W Sichuan and NW Yunnan[266].

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

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[1, 200]. Plants fruit regularly at Kew[11]. The fruit is a good wildlife food source, especially for birds[200]. Hybridizes freely with other members of this genus[200]. Plants in this genus are notably susceptible to honey fungus[200].

6.2.200 Vitis baileyana

Graybark Grape
5 tlin 9 cyuc 2 kcaak 0 tcan 0 dwat 10 m hkuc
hmimhtut cyutli kyuctup hwicli hrasjlutnyik hpa7tli flatprikwis hpa7tmwatti kre7t hjonli

drutta Vitis baileyana is a deciduous Climber growing to 10 m (32ft 10in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to July, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit - raw or dried for winter use[177, 257]. The fruit is about 4 - 7mm in diameter[200] and is borne in bunches. Leaves - raw or cooked. They can be chewed to allay thirst. Young leaves are wrapped around other foods and then baked, they impart a pleasant flavour. Young tendrils - raw or cooked.

tcanta DyeA yellow dye is obtained from the fresh or dried leaves[168].

nrakta South-eastern N. America - Kentucky to Alabama and Arkansas. ksacta River banks and rich thickets[43].

propta Seed - best sown in a cold frame as soon as it is ripe[K]. Six weeks cold stratification improves the germination rate, and so stored seed is best sown in a cold frame as soon as it is obtained. Germination should take place in the first spring, but sometimes takes another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant out in early summer. Cuttings of mature wood of the current seasons growth, December/January in a

frame. These cuttings can be of wood 15 - 30cm long or they can be of short sections of the stem about 5cm long with just one bud at the top of the section. In this case a thin, narrow strip of the bark about 3cm long is removed from the bottom half of the side of the stem. This will encourage callusing and the formation of roots. Due to the size of these cuttings they need to be kept in a more protected environment than the longer cuttings. Layering.

nwatta Prefers a deep rich moist well-drained moderately fertile loam[1, 200]. Grows best in a calcareous soil[200]. Succeeds in sun or partial shade though a warm sunny position is required for the fruit to ripen[200]. Plants climb by means of tendrils[182]. Any pruning should be carried out in winter when the plants are dormant otherwise they bleed profusely[182, 200]. This species is closely related to *V. vulpina*[43]. Plants in this genus are notably susceptible to honey fungus[200].

6.2.201 Carya buckleyi

Black hickory
5 tlin 9 cyuc 2 kcaak 0 tcan 0 dwat 10 m hkuc
htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikwis hpa7tmwatti fyif hjonli

drutta Carya buckleyi is a deciduous Tree growing to 10 m (32ft 10in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf from June to October, in flower from April to May. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: SeedEdible Uses: Seed - raw or cooked[105]. A sweet flavour[1, 82]. The seed ripens in late autumn and, when stored in its shell in a cool place, will keep for at least 6 months[K].

tcanta Fuel WoodWood - hard and brittle. Used mainly for fuel[82].

nrakta Central N. America - Texas and Oklahoma. ksacta Dry sandy uplands[82].

propta Seed - requires a period of cold stratification. It is best sown in a cold frame as soon as it is ripe[78]. Stored seed should be kept moist (but not wet) prior to sowing and should be sown in a cold frame as soon as possible[78]. Where possible, sow 1 or 2 seeds only in each deep pot and thin to the best seedling. If you need to transplant the seedlings, then do this as soon as they are large enough to handle, once more using deep pots to accommodate the tap root. Put the plants into their permanent positions as soon as possible, preferably in their first summer, and give them some protection from the cold for at least the first winter[78, K]. Seed can also be sown in situ so long as protection is given from mice etc and the seed is given some protection from cold[200] (a plastic bottle with the top and bottom removed and a wire mesh top fitted to keep the mice out is ideal)

nwatta Prefers a deep moisture-retentive loam in a sunny sheltered position, requiring a good summer for best development[1, 63, 137, 200]. Slow growing, especially when young[11]. Succeeds outdoors at Kew[11]. Plants are strongly tap-rooted and should be planted in their permanent positions as soon as possible[1, 137]. Sowing in situ would be the best method so long as the seed could be protected from mice[1, 200]. Trees are late coming into leaf (usually late May to June) and lose their leaves early in the autumn (usually in October)[137]. During this time they cast a heavy shade. These factors combine to make the trees eminently suitable for a mixed woodland planting with shrubs and other trees beneath them[137]. Plants in this genus are notably resistant to honey fungus[200]. Most species in this genus have quite a wide range of distribution and, in order to find trees more suited to this country, seed from the most appropriate provenances should be sought[137]. Most trees growing in Britain at present tend to only produce good seed after hot summers[137]. There is some confusion over the correct name of this species, some authorities place it under *C. texana*. Buckl.[137] whilst others say that *C. buckleyi* is the correct name and that there is also a distinct species *C. texana*. DC[11, 82]. According to the Flora of N. America,

tcanta Fuel WoodWood - close grained, tough, strong, brittle[82, 149]. It weighs 50lb per cubic foot[235]. Used mainly for fuel, it burns well giving off a lot of heat[82, 149]. nrakta Southern N. America - Texas. ksacta Dry sandy woods or rocky slopes[43, 137]. Bottomlands and low wet woods[82]. Lowland and upland woods, usually on sandy soils but also sometimes on limestone[274].

propta Seed - requires a period of cold stratification. It is best sown in a cold frame as soon as it is ripe[78]. Stored seed should be kept moist (but not wet) prior to sowing and should be sown in a cold frame as soon as possible[78]. Where possible, sow 1 or 2 seeds only in each deep pot and thin to the best seedling. If you need to transplant the seedlings, then do this as soon as they are large enough to handle, once more using deep pots to accommodate the tap root. Put the plants into their permanent positions as soon as possible, preferably in their first summer, and give them some protection from the cold for at least the first winter[78, K]. Seed can also be sown in situ so long as protection is given from mice etc and the seed is given some protection from cold[200] (a plastic bottle with the top and bottom removed and a wire mesh top fitted to keep the mice out is ideal)

nwatta Prefers a deep moisture-retentive loam in a sunny sheltered position, requiring a good summer for best development[1, 63, 137, 200]. Slow growing[200]. There is some confusion over the naming of this species, with two separate authors of the name being cited. C. texana. Buckl. is used by some authorities as the correct name and C. buckleyi (q.v.) is given as a synonym of that species[11, 137]. However, other authorities cite C. texana. DC. as the correct name, in this case C. buckleyi remains as a separate species[82]. Plants are strongly tap-rooted and should be planted in their permanent positions as soon as possible[1, 137]. Sowing in situ would be the best method so long as the seed could be protected from mice[1, 200]. Trees are late coming into leaf (usually late May to June) and lose their leaves early in the autumn (usually in October)[137]. During this time they cast a heavy shade. These factors combine to make the trees eminently suitable for a mixed woodland planting with shrubs and other trees beneath them[137]. Plants in this genus are notably resistant to honey fungus[200]. Most species in this genus have quite a wide range of distribution and, in order to find trees more suited to this country, seed from the most appropriate provenances should be sought[137]. Most trees growing in Britain at present tend to only produce good seed after hot summers[137]. Trees are self-fertile but larger crops of better quality seeds are produced if cross-pollination takes place[229].

6.2.197 Rhamnus carolinianus

Indian Cherry, Oak, Carolina Buckthorn
5 tlin 9 cyuc 2 kcaak 0 tcan 1 dwat 12 m hkuc
hmmihmtt cyutli tcup hwicli hrasjlutnyikr hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Rhamnus carolinianus is a deciduous Tree growing to 12 m (39ft 4in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in May, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention of toxicity has been found for this species, there is the suggestion that some members of this genus could be mildly poisonous[65].

kcaakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. The fruit has a thin rather dry flesh[82] with a sweet and agreeable flavour[2, 11, 105, 229]. The fruit is about 7-10mm in diameter and contains 2-4 small seeds[229]. Some caution is advised, see the notes above on toxicity.

tcanta WoodWood - rather hard, light, close grained, not strong[82]. It weighs 34lb per cubic foot[227]. Too small to be of commercial value[229].

dwatta HepaticA tea made from the bark is emetic and strongly laxative[222]. It is used in the treatment of constipation with nervous or muscular atony of the intestines[222]. An infusion of the wood has been used in the treatment of jaundice[257].

nrakta Eastern N. America - Virginia to Florida, west to Texas and Nebraska. ksacta Rich woods, sheltered slopes, borders of streams and limestone ridges[43, 82]. Swamps and low ground[235].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. Stored seed will require 1-2 months stratification at 5°C and should be sown as early in the year as possible in a cold frame[200]. Prick out the seedlings into individual pots when they are large enough to handle, and grow them on in the greenhouse or cold frame for their first winter. Plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame[113]. Cuttings of mature wood of the current year's growth, autumn in a frame. Layering in early spring[4].

nwatta Landscape Uses:Border, Erosion control, Pest tolerant, Standard, Specimen. Succeeds in any reasonably good soil[11], whether moderately acid or alkaline[149]. Prefers a moist moderately fertile soil in sun or partial shade[200]. One report suggests that the plant might not be very hardy in Britain[11], whilst another says that it is in climatic zone 6 and thus tolerates temperatures down to about -15°C[200]. A slow-growing and usually short-lived plant in the wild[229]. Plants are susceptible to 'crown rust' of oats[149]. The species in this genus are notably resistant to honey fungus[200]. This species is closely related to R. purshiana[11]. Special Features: North American native, Inconspicuous flowers or blooms.

6.2.198 Pyrus nivalis

Snow Pear
5 tlin 9 cyuc 2 kcaak 0 tcan 0 dwat 10 m hkuc
hmmihmtt cyutli hgatkyuctup hwicli hrasjlutnyikr hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Pyrus nivalis is a deciduous Tree growing to 10 m (32ft 10in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in April. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. It can tolerate atmospheric pollution.

kcaakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[177]. A sour flavour, it is usually cooked or brewed into cider or perry[183, 200]. The fruit matures late in the season and is 3-5cm long[200].

nrakta S.E. Europe to W. Asia. ksacta Sunny slopes and dry open woods in S. Europe[50].

propta Seed - best sown in a cold frame as soon as it is ripe in the autumn, it will then usually germinate in mid to late winter. Stored seed requires 8-10 weeks cold stratification at 1°C and should be sown as early in the year as possible[200]. Temperatures over 15-20°C induce a secondary dormancy in the seed[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for their first year. Plant them out in late spring or early summer of the following year.

nwatta Prefers a good well-drained loam in full sun[200]. Grows well in heavy clay soils. Tolerates light shade but does not fruit so well in such a position. Tolerates atmospheric pollution, excessive moisture and a range of soil types if they are moderately fertile[200]. Established plants are drought tolerant[200]. Plants are hardy to at least -15°C[200]. A very ornamental plant[1].

6.2.199 Malus prattii

Pratt apple
5 tlin 9 cyuc 2 kcaak 0 tcan 0 dwat 10 m hkuc
hmmihmtt cyutli tcup hwicli hrasjlutnyikr hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Malus prattii is a deciduous Tree growing to 10 m (32ft) by 10 m (32ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in May, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is

their permanent positions or to nursery beds. Cuttings of mature wood, placed in a sheltered outdoor bed in the winter, sometimes strike.

nwatta Landscape Uses:Firewood, Pollard, Specimen. Prefers a deep loamy soil, even if it is on the heavy side[1, 200]. Most members of this genus are gross feeders and require a rich soil[11, 200]. Plants can succeed in very exposed positions, including maritime exposure, though they can become wind-shaped[49]. Thrives in alkaline soils[11] but not in shallow soils over chalk. Tolerates a pH as low as 4.5, but prefers a base-rich soil above 5.5[186]. Trees are surprisingly tolerant of seasonally water-logged soils[186]. Dislikes dryness at the roots, especially in late spring[186]. Very intolerant of shade, young plants fail to develop properly in such a position and often die. Although the dormant plant is very cold-hardy, the young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. A fast growing tree, it is sometimes cultivated for its valuable timber. Very tolerant of cutting, ash was also at one time frequently coppiced for its wood[186]. However, modern use of plastics have reduced its economic values. There are many named varieties, selected for their ornamental value[11]. Trees have a light canopy and cast little shade[186]. A food plant for many insect species, there are 41 associated insect species[24, 30]. Trees can be male, female, monoecious or hermaphrodite, they can also change sex from year to year[11]. Trees take 30-40 years to flower from seed[186]. The flowers are produced on one-year old wood[7]. This species is notably resistant to honey fungus[200]. Special Features: Not North American native, Inconspicuous flowers or blooms. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

6.2.180 Aesculus x carnea

Red Horse Chestnut, Ruby Red Horsechestnut
5 tlin 7 cyuc 2 kcaak 0 tcan 1 dwat 25 m hkuc
hmmihmtt cyutli tcup hwicli hrasjlutnyikr hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Aesculus x carnea is a deciduous Tree growing to 25 m (82ft 0in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in July, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The seed is rich in saponins[169]. Although poisonous, saponins are poorly absorbed by the human body and so most pass through without harm. Saponins are quite bitter and can be found in many common foods such as some beans. They can be removed by carefully leaching the seed or flour in running water. Thorough cooking, and perhaps changing the cooking water once, will also normally remove most of them. However, it is not advisable to eat large quantities of food that contain saponins. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K].

kcaakta Edible Parts: SeedEdible Uses: We have no details for this species, but the following notes almost certainly apply to it. Seed - cooked. It can be dried, ground into a flour and used as a gruel. The seed is quite large, about 20mm in diameter, and is also easily harvested. Unfortunately, it is rich in saponins and these toxins need to be removed before the seed can be eaten. See also the notes above on toxicity. The following notes apply to A. californica, but are probably also relevant here: The seed needs to be leached of toxins before it becomes safe to eat - the Indians would do this by slow-roasting the nuts (which would have rendered the saponins harmless) and then cutting them into thin slices, putting them into a cloth bag and rinsing them in a stream for 2-5 days[213]. Most of the minerals etc would also have been leached out by this treatment[K].

tcanta SoapSaponins in the seed are a soap substitute[169]. The saponins can be easily obtained by chopping the seed into small pieces and infusing them in hot water. This water can then be used for washing the body, clothes etc. Its main drawback is a lingering odour of horse chestnuts[K].

dwatta BachThe plant is used in Bach flower remedies - the keywords for prescribing it are 'Excessive fear' and 'Anxiety for others'[209].

nrakta A cultivated hybrid of garden origin, A. hippocastanum x A. pavia. ksacta Not known in the wild.

propta Seed - best sown outdoors or in a cold frame as soon as it is ripe[11, 80]. The seed germinates almost immediately and must be given protection from severe weather[130]. The seed has a very limited viability and must not be allowed to dry out. Stored seed should be soaked for 24 hours prior to sowing and even after this may still not be viable[80, 113]. It is best to sow the seed with its 'scar' downwards[130]. If sowing the seed in a cold frame, pot up the seedlings in early spring and plant them out into their permanent positions in the summer. This species is a garden hybrid though it breeds relatively true from seed[200].

nwatta Landscape Uses:Pest tolerant, Pollard, Specimen, Street tree. Prefers a deep loamy well-drained soil but is not too fussy[1, 11]. The dormant tree tolerates temperatures down to at least -15°C[200], though the young growth in spring can be damaged by late frosts. It prefers a continental climate, growing best in eastern and south-eastern England[200]. There are some named forms selected for their ornamental value[11, 200]. Most members of this genus transplant easily, even when fairly large[11]. Abnormal cell development in this species may result in eruptions on trunks over 30cm in diameter - these ultimately decay[200]. Although a hybrid species, it breeds true from seed due to a doubling of the chromosomes[11, 17]. Special Features:Attractive foliage, Not North American native, Blooms are very showy.

6.2.181 Corylus chinensis

Chinese Hazel
5 tlin 9 cyuc 2 kcaak 0 tcan 0 dwat 24 m hkuc
hmmihmtt cyutli hgattcup hwicli hrasjlutnyikr hpa7tli flatprikliwis hpa7tmwatli fyif hjonli

drutta Corylus chinensis is a deciduous Tree growing to 24 m (78ft 9in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from April to May, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure.

kcaakta Edible Parts: Oil SeedEdible Uses: OilSeed - raw or cooked[63, 105, 177, 183]. Rich in oil. A shrub at Kew was 2 metres tall and 2 metres wide in July 1996 with a reasonable crop of immature fruit[K]. The seed ripens in mid to late autumn and will probably need to be protected from squirrels[K]. When kept in a cool place, and not shelled, the seed should store for at least 12 months[K]. An edible oil is obtained from the seed,

nrakta E. Asia - China. ksacta Shady mixed forests[74]. Forests on moist mountain slopes at elevations of 1200-3500 metres[266].

propta Seed - best sown as soon as it is harvested in autumn in a cold frame[164]. Germinates in late winter or spring. Stored seed should be pre-soaked in warm water for 48 hours and then given 2 weeks warm followed by 3-4 months cold stratification[164]. Germinates in 1-6 months at 20°C[164]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame or sheltered place outdoors for their first winter. Plant them out into their permanent positions in late spring or early summer[K]. Layering in autumn. Easy, it takes about 6 months[78, 200]. Division of suckers in early spring. Very easy, they can be planted out straight into their permanent positions.

nwatta An easily grown plant, it succeeds in most soils, but is in general more productive of seeds when grown on

soils of moderate fertility[11, 200]. It does less well in rich heavy soils or poor ones[11, 63]. Does well in a loamy soil[11]. Very suitable for an alkaline soil[11], but it dislikes very acid soils[17]. Plants are fairly wind tolerant[1, 11]. Once established, this species is drought resistant[183]. It does not produce suckers[183]. A very ornamental tree[1], it is closely allied to *C. colurna*[11]. It has become very rare in China where it is considered to be at risk of extinction[266]. Members of this genus bear transplanting well and can be easily moved even when relatively large[11]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2].

6.2.182 Quercus phellos

Willow Oak

5 tlin 9 cyuc 2 kcaok 0 tcan 2 dwat 20 m hkuc hmimhtut cyutli tcup hwicli jlutnyik hpa7tli flatprikliwis hpa7tmwattli hjonli

drutta *Quercus phellos* is a deciduous Tree growing to 20 m (65ft) by 10 m (32ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from April to May, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils. Suitable pH: mildly acidic, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: CoffeeSeed - cooked[2, 63, 105]. Rather small, it is only 1cm long[11, 200]. The seed can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed contains bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute.

tcanta Buttons Charcoal Repellent Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. The bark contains about 10% tannin and is a commercial source of that material[223]. Tannin is also found in the leaves and wood[223]. The seedcups are also used as buttons[95]. Wood - close-grained, strong, not hard, heavy, not durable[46, 61, 82, 171, 227]. It weighs 46lb per cubic foot[227]. Of rather low quality for an oak but it is sufficiently abundant to be harvested commercially. The wood is used for construction, felines of wheels and charcoal[46, 61, 82, 171, 227].

dwatta Analgesic Astringent Dysentery SalveA decoction of the wood chips or bark has been applied externally as an analgesic and as a bath for aches, pains, sores, cuts and haemorrhoids[257]. Any galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta South-eastern N. America - Staten Island to Georgia, west to Texas. ksacta Low wet borders of swamps and streams, bottom lands and sandy uplands on rich soils[43, 82].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities

of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Landscape Uses:Firewood, Pest tolerant, Aggressive surface roots possible, Specimen, Street tree. Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Lime tolerant[188]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. Although it prefers warmer summers than are usually experienced in Britain[200], this species thrives in this country[11], though it rarely sets seed here[80]. Trees commence to bear seeds when about 20 years old in the wild and good crops are usually produced annually[229]. The tree flowers on new growth produced in spring, the seed taking two summers to ripen[229]. A very ornamental plant[1]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. Hybridizes freely with other members of the genus[200]. This species is notably resistant to honey fungus[88, 200]. Special Features:Attracts birds, North American native, Inconspicuous flowers or blooms.

6.2.183 Quercus nigra

Water Oak

5 tlin 9 cyuc 2 kcaok 0 tcan 2 dwat 20 m hkuc hmimhtut cyutli tcup hwicli jlutnyik hpa7tli flatprikliwis hpa7tmwattli hjonli

drutta *Quercus nigra* is a deciduous Tree growing to 20 m (65ft) by 8 m (26ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from April to May, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils. Suitable pH: mildly acidic, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: CoffeeSeed - cooked[61, 105, 161]. A staple food for some native North American Indian tribes[257]. The seed is about 15cm long and wide[82, 200], it can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed contains bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute[257].

tcanta Fuel Repellent Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. Wood - heavy, hard, strong, close-grained[61, 82, 227, 235]. It weighs 45lb per cubic foot[235]. It is used for cross-ties and poles[227], but is little valued except as a fuel[61, 82].

dwatta Astringent DysenteryAny galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta South-eastern N. America - New Jersey to Florida, west to Oklahoma. ksacta Dry woods or borders of streams and bottomlands[43]. The best specimens are found in well-drained, silty clay or loamy soils[229].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it

tcanta Gum Gum Shelterbelt WoodWood - heavy, rather soft, not strong, close grained[82, 149]. It weighs about 40lb per cubic foot[227]. Used for tool handles, cabinet making etc[82, 149].

nrakta South-eastern N. America - Florida to Texas and Mexico. ksacta On sandy beaches and in sandy woods, preferring water courses and washes[43, 82, 181].

propta Seed - we have no details on this species but would suggest that if ripe seed can be obtained it should be sown straight away in a cold greenhouse. Stored seed can be sown in late winter or early spring in a greenhouse. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter, planting them out into their permanent positions in late spring or early summer, after the last expected frosts.

nwatta Succeeds in a warm sunny site in any freely draining moderately fertile soil[200]. Tolerates salt spray[82]. This species is probably hardy in the milder areas of the country[1, 11]. Another report says that plants are cut back by temperatures below about -15°C but that they can regenerate freely from the base[200]. The flowers are an excellent source of honey[274].

6.2.194 Malus trilobata

5 tlin 9 cyuc 2 kcaok 0 tcan 0 dwat 15 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikliwis hpa7tmwattli xre7t hjonli

drutta *Malus trilobata* is a deciduous Tree growing to 15 m (49ft) by 7 m (23ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acidic, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. A pleasant pear-like flavour[2, 105, 177]. The fruit is up to 2cm in diameter[200].

nrakta S. Europe to W. Asia. ksacta Evergreen scrub[50].

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

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[1, 200]. A very ornamental plant[1], the fruit is a good wildlife food source, especially for birds[200]. Hybridizes freely with other members of this genus[200]. Plants in this genus are notably susceptible to honey fungus[200].

6.2.195 Pyrus calleryana

Callery Pear

5 tlin 9 cyuc 2 kcaok 0 tcan 0 dwat 15 m hkuc hmimhtut cyutli hgattcup hwicli hrasjlutnyikfrip hpa7tli frusflatprikliwis hpa7tmwattli xre7t hjonli

drutta *Pyrus calleryana* is a deciduous Tree growing to 15 m (49ft) by 15 m (49ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf from April to November, in flower in May, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acidic, neutral and basic (mildly alkaline) soils and can grow in very acidic soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105]. Best used after it has been exposed to frost[177, 183], since this will soften and sweeten the flesh[K]. The fruit is about 25mm in diameter[200].

tcanta Rootstock WoodThis species is widely used as a rootstock[183], especially for cultivars of *Pyrus pyrifolia*[266]. It is said to induce earlier bearing[160]. The wood of this species is hard and close-grained, and is sometimes used for making furniture and stools[266].

nrakta E. Asia - China, central and southern Japan. ksacta Thickets and streambanks to 1500 metres[109]. Slopes, plains, mixed valley forests and thickets at elevations of 100 - 1800 metres[266].

propta Seed - best sown in a cold frame as soon as it is ripe in the autumn, it will then usually germinate in mid to late winter. Stored seed requires 8 - 10 weeks cold stratification at 1°C and should be sown as early in the year as possible[200]. Temperatures over 15 - 20°C induce a secondary dormancy in the seed[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for their first year. Plant them out in late spring or early summer of the following year.

nwatta Landscape Uses:Espalier, Firewood, Screen, Specimen, Street tree. Prefers a good well-drained loam in full sun[200]. Grows well in heavy clay soils. Tolerates light shade but does not fruit so well in such a position. Tolerates atmospheric pollution, excessive moisture and a range of soil types if they are moderately fertile[200]. Established plants are drought tolerant[200]. Grows well on acid soils[160]. Plants are hardy to about -40°C when they are fully dormant[160]. There are many named forms selected for their ornamental value[200]. The cultivar 'Bradford' is resistant to fireblight[188]. Resists fireblight, collar rot, root aphid, pear psylla and root lesion nematodes[160]. Trees have a short dormancy period and lose their leaves late in the season[160]. Special Features: Not North American native, Naturalizing, Blooms are very showy.

6.2.196 Carya texana

Black Hickory

5 tlin 9 cyuc 2 kcaok 0 tcan 0 dwat 15 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwattli fyif hjonli

drutta *Carya texana* is a deciduous Tree growing to 15 m (49ft 3in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf from June to October, in flower from April to May. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acidic, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: SeedEdible Uses: Seed - raw or cooked[105, 177]. A sweet flavour, but the seed is small with a very thick shell[149, 227]. Another report says that the kernel has a bitter flavour[274]. The seed is up to 4cm long[229]. The seed ripens in late autumn and, when stored in its shell in a cool place, will keep for at least 6 months[K].

nrakta E. Asia - Japan. ksacta Forests in mountains all over Japan[58, 200].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed must be kept cold over the winter and should be sown in late winter in a cold frame[200]. The seed usually germinates in the spring but it can take 18 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for at least their first winter. They can be planted out into their permanent positions when they are more than 15cm tall, though should be well mulched and given some protection from winter cold for their first winter or two outdoors. Layering in early spring[200].

nwatta Landscape Uses:Specimen. Best grown in a warm position in a moderately rich free soil of an open texture[1]. Dislikes alkaline soils[200]. Tolerates alkaline soils so long as they are deep and rich in humus[188]. The branches are brittle so a sheltered position is required[200]. Very tolerant of atmospheric pollution[200]. Hardy to about -20°c[200]. The fleshy roots are easily damaged and any transplanting is best done during a spell of mild moist weather in late spring[182]. A very ornamental plant[1]. The flowers are powerfully scented[245]. Cultivated for its medicinal bark in Japan[178]. Special Features: Not North American native, Fragrant flowers, Attractive flowers or blooms.

6.2.191 Morus cathayana

Hua Sang
5 tlin 9 cyuc 2 kcaak 0 tcan 0 dwat 15 m hkuc hmimhtut cyutli tcup hwicli hrasjltunyk hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Morus cathayana is a deciduous Tree growing to 15 m (49ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to June, and the seeds ripen from August to September. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: TeaFruit - raw or cooked[177]. The fruit is about 25mm in diameter[200]. Leaves - cooked[177]. A tea is made from the leaves[177].

nrakta E. Asia - China, Japan, Korea ksacta Woodlands and sides of streams, 600 - 1300 metres in W. Hupeh[109]. Sunny slopes or valleys, high mountains at elevations of 900 - 1300 metres[266].

propta The seed germinates best if given 2 - 3 months cold stratification[80, 98]. Sow the seed as soon as it is ripe if possible, otherwise in February in a cold frame. The seed usually germinates in the first spring, though it sometimes takes another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the cold frame for their first winter. Plant them out in late spring or early summer after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame. Plant out in spring. A good percentage take, though they sometimes fail to thrive[78, 113]. Cuttings of mature wood of the current season's growth, 25 - 30cm with a heel of 2 year old wood, autumn or early spring in a cold frame or a shady bed outside[78, 113, 200]. Bury the cuttings to threequarters of their depth. Layering in autumn[200].

nwatta Prefers a warm well-drained loamy soil in a sunny position[1, 11]. Two trees at Kew in mid-July 1994 had reasonable crops of fairly long thin fruits with a pleasant flavour[K]. Mulberries have brittle roots and so need to be handled with care when planting them out[238]. Any pruning should only be carried out in the winter when the plant is fully dormant because mulberries bleed badly when cut[238]. Ideally prune only badly placed branches and dead wood[238]. Plants in this genus are notably resistant to honey fungus[200].

6.2.192 Cornus controversa

Giant Dogwood, Wedding Cake Tree,
5 tlin 8 cyuc 2 kcaak 0 tcan 1 dwat 15 m hkuc hmimhtut cyutli tcup hwicli hrasjltunykrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Cornus controversa is a deciduous Tree growing to 15 m (49ft) by 15 m (49ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to July, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit OilEdible Uses: OilFruit[105, 177]. No more details are given. The fruit is about 6mm in diameter[200].

tcanta OilThe fruit provides an oil used in the lubricating and soap industry[266].

dwatta AntiphlogisticThe leaves are used in folk remedies to relieve pain and reduce swelling[266].

nrakta E. Asia - China, Japan, Himalayas. ksacta Woodland, hedges and thickets, 600 - 2000 metres in W. China[109]. Broad-leaved or mixed broad-leaved and needle-leaved forests at elevations of 200 - 2600 metres[266].

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

nwatta Landscape Uses:Pest tolerant, Woodland garden. An easily grown plant, it succeeds in any soil of good or moderate fertility[1], ranging from acid to shallow chalk[200]. Grows well in heavy clay soils. Succeeds in full sun or light shade[188]. A very ornamental plant[1, 11], it is hardy to about -20°c[184]. This species is unusual in having alternate leaves whilst almost all other members of this genus have opposite leaves[182]. Closely related to *C. alternifolia*[200]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: Not North American native, Attractive flowers or blooms.

6.2.193 Bumelia lanuginosa

Chittamwood
5 tlin 9 cyuc 2 kcaak 0 tcan 0 dwat 15 m hkuc htut cyutli tcup hwicli hrasjltunyk hpa7tli flatpriklwishsom hpa7tmwatli xre7t hjonli

drutta Bumelia lanuginosa is a deciduous Tree growing to 15 m (49ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in saline soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: FruitEdible Uses: Gum GumFruit - usually pickled[161, 177]. Not very tasty according to one report[61] whilst another says that large quantities can cause stomach upsets[149]. The fruit is between 1 - 2cm in diameter[200]. A clear viscid gum is obtained from the cut wood[82]. It also exudes freely from wounds on the trunk and branches[227]. The dried and ground up bark is used like chicle as a chewing gum[61, 177].

must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Lime tolerant[188]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. Prefers warmer summers than are usually experienced in Britain, trees often grow poorly in this country and fail to properly ripen their wood resulting in frost damage overwinter[200]. A fast-growing tree in its native habitat, it does not bear seeds until about 20 years old[229]. Seed production is cyclic, a year of high yields being followed by a year of low yields[229]. The tree flowers on new growth produced in spring, the seed taking two summers to ripen[229]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200].

6.2.184 Ampelopsis brevipedunculata

Porcelain Berry, Amur peppervine, Blueberry Climber, Porcelain Berry Vine

5 tlin 8 cyuc 2 kcaak 1 tcan 2 dwat 20 m hkuc hmimhtut cyutli tcup hwicli hyishrasjltunyk hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Ampelopsis brevipedunculata is a deciduous Climber growing to 20 m (65ft 7in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from July to August, and the seeds ripen from October to November. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: Leaf buds - cooked[105]. Leaves and stems - cooked[2, 105, 177]. Fruit - raw or cooked[105, 177]. The fruit is 6 - 8mm in diameter[200] and is carried in small bunches like grapes[K]. Not very palatable[K].

tcanta An ornamental plant. Landscape Uses: Arbor, Container, Pollard.

dwatta Antiphlogistic Depurative FebrifugeThe fresh fruits, roots and leaves are antiphlogistic, depurative and febrifuge. Resolves clots[147]. It is used externally in the treatment of boils, abscesses and ulcers, traumatic bruises and aches[147].

nrakta E. Asia - China, Japan, Korea, E. Russia. ksacta Thickets in hills all over Japan[58]. Climbing up trees in valleys or over shrubs on hillsides at elevations of 100 - 600 metres in Heilongjiang, Jilin and Liaoning provinces of China[266].

propta Seed - sow in pots in a cold frame in the autumn or stratify for 6 weeks at 5°c and sow in the spring[200]. Germination can be quite slow, sometimes taking more than a year. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. When they are more than 20cm tall, they can be planted out into their permanent positions, preferably in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm long, July/August in a frame[78]. Cuttings or eyes in late autumn or winter. Either place them in the ground in a greenhouse or cold frame, or put them in pots. An eye cutting is where you have just one bud at the top and a short length of stem with a small part of the bark removed. These normally root well and grow away vigorously, being ready to plant into their permanent positions the following autumn. Layering into pots in late summer. Partially sever the stem in spring and then lift the new plants in the autumn[78].

nwatta Landscape Uses:Arbor, Container, Pollard. Prefers a deep rich loam in a warm sheltered position in full sun[11, 200]. Succeeds in poor soils[182]. Does well on a south wall[11, 219]. A very ornamental plant, there are some named varieties[182]. Most forms of this species, especially the sub-species *A. brevipedunculata maximowiczii*. (Reg.)Rehd. (syn *A. heterophylla*. Sieb. and Zucc.), are very hardy in Britain when dormant, but the cultivar 'Elegans' is frost-tender and usually grown as a pot plant[200]. The draft Flora of China has a different treatment for these plants, it recognises *A. heterophylla* as the correct name for *A. brevipedunculata maximowiczii* and reduces this species to a subspecies as *A. heterophylla brevipedunculata*[266]. The young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. Plants rarely fruit in Britain except after a long hot summer[200]. Another report says that if the plant is growing in a poor soil on a south facing wall then it fruits quite regularly[182]. Plants fruit better if their roots are restricted, this can be achieved by root pruning in the winter or by putting the plant into a large container and then placing this in the soil[200]. Growth, especially in good soils, can be very vigorous and this is usually at the expense of the fruits[202]. Any pruning is best carried out in the winter[219]. The shoots have sticky pads and are self-supporting on walls[11]. Other reports say that plants climb by means of coiling tendrils but large plants often need tying in to support the weight of foliage[200, 219]. Special Features: Attracts birds, Attractive foliage, Not North American native, Invasive, Inconspicuous flowers or blooms.

6.2.185 Aesculus turbinata

Japanese Horse Chestnut
5 tin 7 cyuc 2 kcaak 0 tcan 0 dwat 20 m hkuc hmimhtut cyutli tcup hwicli hrasjltunyk hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Aesculus turbinata is a deciduous Tree growing to 20 m (65ft) by 12 m (39ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in June, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The seed is rich in saponins[169]. Although poisonous, saponins are poorly absorbed by the human body and so most pass through without harm. Saponins are quite bitter and can be found in many common foods such as some beans. They can be removed by carefully leaching the seed or flour in running water. Thorough cooking, and perhaps changing the cooking water once, will also normally remove most of them. However, it is not advisable to eat large quantities of food that contain saponins. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K].

kcakta Edible Parts: Leaves SeedEdible Uses: Young leaves cooked[177]. Some caution is advised on this entry since the leaves are likely to contain toxic saponins (see notes above on toxicity). Seed - cooked. It can be dried, ground into a flour and used as a gruel. The starch is extracted and eaten[177]. The seed is quite large, about 25 - 30mm in diameter, and is easily harvested. Unfortunately it is also rich in saponins and these need to be removed before the seed can be eaten. See also the notes above on toxicity. The following notes apply to *A. californica*, but are probably also relevant here:- The seed needs to be leached of toxins before it becomes safe to eat - the Indians would do this by slow-roasting the nuts (which would have rendered the saponins harmless) and then cutting them into thin slices, putting them into a cloth bag and rinsing them in a stream for 2 - 5 days[213]. Most of the minerals etc would also have been leached out by this treatment[K].

tcanta Soap WoodSaponins in the seed are a soap substitute[169]. The saponins can be easily obtained by chopping the seed into small pieces and infusing them in hot water. This water can then be used for washing the body, clothes etc. Its main drawback is a lingering odour of horse chest-

nuts[K]. Wood - weak, nicely grained. Used for flower fittings, domestic items etc[11].

nrakta E. Asia - China, Japan ksacta Mountains, especially in ravines, all over Japan[58]. In deciduous forests, especially in moist slopes along streams[275].

propta Seed - best sown outdoors or in a cold frame as soon as it is ripe[11, 80]. The seed germinates almost immediately and must be given protection from severe weather[130]. The seed has a very limited viability and must not be allowed to dry out. Stored seed should be soaked for 24 hours prior to sowing and even after this may still not be viable[80, 113]. It is best to sow the seed with its 'scar' downwards[130]. If sowing the seed in a cold frame, pot up the seedlings in early spring and plant them out into their permanent positions in the summer.

nwatta Landscape Uses:Specimen. Prefers a deep loamy well-drained soil but is not too fussy[11, 11]. The dormant plant is very cold-hardy, though the young growth in spring can be damaged by late frosts. It prefers growing in a continental climate, doing best in eastern and south-eastern England[200]. Most members of this genus transplant easily, even when fairly large[11]. Special Features:Attractive foliage, Not North American native, Blooms are very showy.

6.2.186 Juniperus excelsa

Grecian Juniper

5 tlin 9 cyuc 2 kcaak 3 tcan 1 dwat 20 m hkuc

htut cyutli hgatkyuctcup hwicli hrasjltunyk hpa7tli flatprikli-wisslip hpa7tmwatli nyanhjen hjonli

drutta Juniperus excelsa is an evergreen Tree growing to 20 m (65ft 7in). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, and the seeds ripen in October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. A liquid is obtained from the fruit[146] (used for drinking?). The cones are about 7 - 12mm in diameter and take 2 years to mature[200].

tcanta Fuel Incense Miscellany Roofing WoodThe bark is used for roofing[146]. Wood - moderately hard, close and even grained, fragrant, good quality. Used for construction, fuel and it is also burnt as an incense[1, 146, 158]. The crushed foliage emits a warm resinous scent[185].

dwatta MiscellanyThe smoke from the branches is used in India to treat the delirium of fevers[240].

nrakta S. Europe to E. Asia. ksacta Inner dry ranges of the Himalayas, 1500 - 4200 metres[146], from Nepal to Afghanistan.

propta The seed requires a period of cold stratification. The seed has a hard seedcoat and can be very slow to germinate, requiring a cold period followed by a warm period and then another cold spell, each of 2 - 3 months duration[78, 81]. Soaking the seed for 3 - 6 seconds in boiling water may speed up the germination process[11]. The seed is best sown as soon as it is ripe in a cold frame. Some might germinate in the following spring, though most will take another year. Another possibility is to harvest the seed 'green' (when the embryo has fully formed but before the seedcoat has hardened). The seedlings can be potted up into individual pots when they are large enough to handle. Grow on in pots until large enough, then plant out in early summer. When stored dry, the seed can remain viable for several years[1]. Cuttings of mature wood, 5 - 10cm with a heel, September/October in a cold frame. Plant out in the following autumn[1, 78]. Layering in September/October. Takes 12 months[78].

nwatta Succeeds in dry soils. Succeeds in most soils if they are well drained, preferring a neutral or slightly alkaline soil[11] and succeeding on chalk[200]. Plants are tender when young, they require a sheltered position[1]. The crushed foliage emits a warm resinous scent[185]. Plants are usually dioecious though sometimes they are monoecious[11]. Male and female plants must be grown if seed is required. In garden design, as well as the above-ground

architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is flat with shallow roots spreading near the soil surface [2-1].

6.2.187 Ulmus parvifolia

Chinese Elm, Lacebark Elm

5 tlin 10 cyuc 2 kcaak 0 tcan 1 dwat 18 m hkuc

hmimhtut cyutli tcup hwicli hrasjltunyk hpa7tli flatprikliw hpa7tmwatli xre7t hjonli

drutta Ulmus parvifolia is a deciduous Tree growing to 18 m (59ft) by 18 m (59ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf from March to January, in flower from September to October, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Fruit Inner bark LeavesEdible Uses: Leaves - raw or cooked[105, 177]. Immature fruits, used just after they are formed - raw or cooked[105, 132]. An aromatic, unusual flavour, leaving the mouth feeling fresh and the breath smelling pleasant[132]. It contains about 34.4% protein, 28.2% fat, 17% carbohydrate, 5% ash[132]. Inner bark - cooked. A mucilaginous texture[105, 177]. No more details are given but inner bark is often dried, ground into a powder and then used as a thickening in soups etc or mixed with cereals when making bread[K].

tcanta Shelterbelt WoodFairly resistant to maritime exposure, it can be grown in a shelter belt[K].

dwatta Antidote Demulcent Diuretic Expectorant Febrifuge Hypnotic LithotropicThe leaves are antidote and lithotropic[218]. The stem bark is demulcent, diuretic, expectorant, febrifuge, hypnotic and lithotropic[178, 218]. The flowers are used in the treatment of fevers and neuritis[218].

nrakta E. Asia - China, Japan, Korea. ksacta Rich soil and near water courses in W. China[109] at elevations below 800 metres[266].

propta Seed - if sown in a cold frame as soon as it is ripe, it usually germinates within a few days[200]. Stored seed does not germinate so well and should be sown in early spring[200]. One to two months stratification can improve germination rates. The seed can also be harvested 'green' (when it has fully developed but before it dries on the tree) and sown immediately in a cold frame. It should germinate very quickly and will produce a larger plant by the end of the growing season[80]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Plants should not be allowed to grow for more than two years in a nursery bed since they form a tap root and will then move badly. Layering of suckers or coppiced shoots[200].

nwatta Landscape Uses:Aggressive surface roots possible, Pollard, Specimen, Street tree. Easily grown in any soil of at least moderate quality so long as it is well drained[1]. Fairly tolerant of maritime exposure, it succeeds outdoors in a very exposed position at Rosewarne in N. Cornwall[K]. Resistant to 'Dutch elm disease', a disease that has destroyed the greater part of all the elm trees growing in Britain. The disease is spread by a beetle. There is no effective cure (1992) for the problem, but most E. Asian, though not Himalayan, species are resistant (though not immune) to the disease so the potential exists to use these resistant species to develop new resistant hybrids with the native species[200]. The various species hybridize freely, the pollen stores well and can be kept for use with species that flower at different times[200]. Trees retain their leaves until early in the new year[11] and in areas with mild winters will often retain them until new leaves are formed in the spring[188]. A good companion for grapes[18]. There are some named forms, developed for their ornamental value. 'Frosty' and 'Geisha' are small bushes whilst 'Pumila' is a minute bush

for the rock garden. Special Features: Not North American native, Inconspicuous flowers or blooms.

6.2.188 Celtis laevigata

Sugarberry, Netleaf hackberry, Texan sugarberry, Sugar Hackberry

5 tlin 10 cyuc 2 kcaak 3 tcan 1 dwat 18 m hkuc

htut cyutli hgatkyuctcup hwicli hyhisrasjltunyk hpa7tli flatprikliw hpa7tmwatli xre7t hjonli

drutta Celtis laevigata is a deciduous Tree growing to 18 m (59ft 1in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in April, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[61, 105, 257]. The flesh is thin, dry and sweetish, covering a single large seed[149, 183]. The fruit, which is orange to brown or red when fully ripe, is 5 - 8mm in diameter[235, 270].

tcanta Fuel Miscellany WoodWood - soft, not strong, close grained. It weighs 49lb per cubic foot and is used for cheap furniture, fencing, fuel[61, 82, 227].

dwatta Miscellany VDA decoction of the bark has been used in the treatment of sore throats[257]. It has also been used, mixed with powdered shells, as a treatment for VD[257].

nrakta South-eastern N. America - Virginia to Illinois and Missouri, south to Florida and Texas. ksacta In rich bottomlands along streams, in flood plains, and on rocky slopes, generally in clay soils, from sea level to 300 metres[229, 270].

propta Seed - best sown as soon as it is ripe in a cold frame[200]. Stored seed is best given 2 - 3 months cold stratification and then sown February/March in a greenhouse[78, 200]. Germination rates are usually good, though the stored seed might take 12 months or more to germinate. The seed can be stored for up to 5 years[113]. As soon as they are large enough to handle, prick the seedlings out into individual pots. The leaves of seedlings often have a lot of white patches without chlorophyll, this is normal and older plants produce normal green leaves. Grow the seedlings on in a cold frame for their first winter, and plant them out in the following late spring or early summer[K]. Give them some protection from the cold for their first winter outdoors. Cuttings

nwatta Landscape Uses:Erosion control, Pest tolerant, Aggressive surface roots possible, Street tree, Woodland garden. Succeeds in any reasonably good soil, preferring a good fertile well-drained loamy soil[1, 11, 200]. Succeeds on dry gravels and on sandy soils[200]. Plants are usually found on clay soils in the wild[229]. Established plants are very drought resistant[200]. Trees prefer hotter summers and more sunlight than are normally experienced in Britain, they often do not fully ripen their wood when growing in this country and they are then very subject to die-back in winter[1, 11, 200]. A very variable species, according to some botanists these merit varietal status whilst other botanists say that the differences are too slight[227]. Trees are moderate to fast-growing, probably living no more than 125 - 150 years[229]. They can be very long-lived according to another report, perhaps surviving for 1000 years[200]. Trees fruit heavily most years[229]. Plants in this genus are notably resistant to honey fungus[200]. Special Features:North American native, Naturalizing, Wetlands plant, Attracts butterflies, Inconspicuous flowers or blooms. The plant is heat tolerant in zones 9 through 3. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as

the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2].

6.2.189 Sinofranchetia chinensis

5 tlin 9 cyuc 2 kcaak 0 tcan 0 dwat 15 m hkuc

hmimhtut cyutli tcup hwicli hrasjltunyk hpa7tli flatprikliw hpa7tmwatli nyanhjen hjonli

drutta Sinofranchetia chinensis is a deciduous Climber growing to 15 m (49ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in May, and the seeds ripen in October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw[105, 177]. Inspid[109]. The size of a grape[182]. The fruit is about 2cm in diameter[200].

nrakta E. Asia - C. and W. China. ksacta Woodland, 1500 - 2800 metres[109]. Dense forests along valleys, forest margins and among shrubs[266].

propta Seed - can be sown as soon as it is ripe or in late winter in a cold frame. Prick out the seedlings into individual pots once they are large enough to handle and grow them on in the cold frame for their first winter. Plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Layering of new shoots in summer.

nwatta Succeeds in any ordinary garden soil in sun or shade[1, 200]. Prefers semi-shade[188, 219]. The young growth in spring can be damaged by late frosts. A fast growing climbing plant[200], supporting itself by twining around other plants etc[219]. Any pruning is best carried out after the plant has finished flowering[219]. Dioecious, but female plants can produce fruits in the absence of male plants[11, 200]. The report does not say if this fruit contains viable seed, so it is best to assume that male and female plants must be grown if seed is required[K].

6.2.190 Magnolia hypoleuca

Whitebark Magnolia

5 tlin 9 cyuc 2 kcaak 0 tcan 2 dwat 15 m hkuc

hmimhtut cyutli tcup hwicli hrasjltunyk hpa7tli flatprikliw hpa7tmwatli xre7t hjonli

drutta Magnolia hypoleuca is a deciduous Tree growing to 15 m (49ft) by 6 m (19ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Beetles. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. It can tolerate atmospheric pollution.

kcakta Edible Parts: LeavesEdible Uses: CondimentThe young leaves and flower buds are boiled and eaten as a vegetable[183]. Older leaves are powdered and sprinkled on food as a flavouring[183]. Whole dried leaves are placed on a barbecue, filled with miso, leeks, daikon and shitake then broiled[183]. The delightful aroma of the leaves permeates the miso mixture which is then served with rice[183].

tcanta WoodWood - soft, fine grained, easily worked. Used for furniture, engraving, utensils etc[11, 46, 61, 178].

dwatta Anthelmintic Antiemetic Appetizer Deobstruent Emmenagogue Expectorant Ophthalmic Sedative Stomachic TonicAnthelmintic, antiemetic, appetizer, deobstruent, emmenagogue, expectorant, ophthalmic, sedative, stomachic, tonic[174, 178]. This plant is contra-indicated for pregnant women[174].

bruises etc[7]. Chewing 1 - 4 leaves per day has proven to be effective in the treatment of some migraine headaches[222].

nrakta S.E. Europe to Asia. Naturalized in Britain[17]. ksacta Mountain scrub, rocky slopes, walls, waste places and a weed of gardens, avoiding acid soils[9].

propta Seed - sow spring in a greenhouse. Only just cover the seed and do not allow the pot to dry out. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in early summer, after the last expected frosts. If you have sufficient seed it can be sown outdoors in situ during the spring. Plants usually self-sow freely and so, once you have the plant, further sowing is usually unnecessary[K]. Division in spring. Since the plants are quite short-lived, this method is not really very serviceable[K].

nwatta Landscape Uses:Border, Container, Foundation, Massing, Rock garden. A very easily grown plant, it succeeds in an ordinary garden soil[1]. Thrives in any kind of soil[7], plants can even be grown in walls[219]. Often grown in the flower garden, feverfew is a short lived perennial but usually self-sows prolifically[7, K]. There are many named varieties selected for their ornamental value[238]. The cultivar ‘Golden’ (syn ‘Yellow’) has yellow tinted leaves[183]. The leaves have a refreshing aromatic aroma[245]. Special Features:Attractive foliage, Edible, Fragrant foliage, Not North American native, Attracts butterflies, Suitable for cut flowers, Suitable for dried flowers. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

6.2.310 Potentilla nepalensis

Nepal Cinquefoil, Cinquefoil

5 tlin 10 cyuc 2 kcak 0 tcan 1 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta Potentilla nepalensis is a PERENNIAL growing to 0.6 m (2ft) by 0.6 m (2ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Root - cooked. Starchy[177].

dwatta DepurativeThe root is depurative[240]. The ashes are mixed with oil and applied to burns[240].

nrakta E. Asia - W. Himalayas. ksacta Grazing grounds and cultivated areas, 2100 - 2700 metres from Pakistan to C. Nepal[51].

propta Seed - sow early spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Landscape Uses:Alpine garden, Border, Container, Ground cover, Rock garden, Specimen. A very tolerant and easily grown plant, surviving considerable neglect[K]. It grows best in a well-drained loam, preferring a position in full sun but tolerating shade[1]. Prefers an alkaline soil but tolerates a slightly acid soil[200]. There are many named forms selected for their ornamental value[187]. Members of this genus are rarely if ever troubled by browsing deer[233]. Special Features: Attractive foliage, Suitable for cut flowers.

6.2.311 Aster tripolium

Sea Aster

5 tlin 9 cyuc 2 kcak 0 tcan 1 dwat 0.9 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwshom hpa7tmwatli fyifxre7t hjonli

drutta Aster tripolium is a PERENNIAL growing to 0.9 m (3ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in saline soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves and stems - the somewhat fleshy leaves are used to make pickles or are cooked[2, 105, 177]. A sweet taste[179]. The stem contains about 8.4% ash, whilst the leaf is 9% ash - this is mainly sodium chloride[179]. dwatta OphthalmicOphthalmic[100].

nrakta Coastal areas of Europe, including Britain, N. Africa and saline inland areas of Europe and C. Asia. ksacta Salt marshes and maritime cliffs[17].

propta Seed - surface sow in spring in a cold frame. Do not allow the compost to become dry. Pre-chilling the seed for two weeks can improve germination rates[134]. Germination usually takes place within 2 weeks at 20°c[134]. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer.

nwatta Succeeds in most good garden soils[1], preferring one that is well-drained and moisture retentive[200]. Prefers a sunny position[200]. This species tends to be a short-lived perennial[17]. Most species in this genus seem to be immune to the predations of rabbits[233]. Hybridizes freely with other members of this genus[200].

6.2.312 Ornithogalum pyrenaicum

Bath Asparagus, Pyrenees star of Bethlehem

5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Ornithogalum pyrenaicum is a BULB growing to 0.6 m (2ft) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to July, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Skin contact with the bulb can cause dermatitis in sensitive people[65]. Any toxins in this plant are concentrated in the bulb[200].

kcakta Edible Parts: Leaves StemEdible Uses: Young shoots - cooked[1, 5, 46, 61]. The young, unexpanded flowering shoots are cooked and served like asparagus[2, 4, 17, 177, 183].

nrakta S. Europe. Naturalized in Britain. ksacta Woods and scrub[17]. Dry stony places[190].

propta Seed - best sown as soon as it is ripe in a cold frame[200]. Sow the seed thinly and leave the seedlings undisturbed in the pots for their first dormancy, but apply liquid feed at intervals, especially in their second year of growth. Divide the bulbs at the end of their second year of growth, putting 2 - 3 bulbs in each pot. Grow them on for one more year and them plant them out into their permanent positions whilst they are dormant. The seed can also be sown in a cold frame in early spring. Division of offsets in September/October[200]. The larger bulbs can be replanted immediately into their permanent positions. It is best to pot up the smaller bulbs and grow them on for a year before planting them out when dormant in late summer.

nwatta An easily grown plant, succeeding in ordinary garden soil[1, 42], thriving in sun or shade[42]. Succeeds in dry soils and, once established, is drought tolerant[190]. Plants are hardy to about -20°c[200]. Grows well in the wild garden[200]. The flowering shoots used to be sold as a food crop in Bath market[183].

male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[272]. A sweet flavour but there is very little flesh in relation to the size of the single large seed[K].

tcanta Miscellany WoodWood - soft to hard, close and even grained. The wood is hardest in the cooler parts of its range, the Himalayan form is a possible Boxwood (Buxus spp) substitute[146].

dwatta MiscellanyThe juice of the roots is used in the treatment of coughs[272].

nrakta E. Asia - China to the Himalayas and Sri Lanka. ksacta Forests and shrubberies, 1500 - 3300 metres, from Uttar Pradesh to S.W. China[51, 146].

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

nwatta An easily grown plant, it succeeds in most soils but is ill-adapted for poor soils and for dry situations[1]. It prefers a deep rich loamy soil in sun or semi-shade[11, 200]. Best if given shade from the early morning sun in spring[200]. Not all forms of this species are hardy in Britain[11]. Plants are self-incompatible and need to grow close to a genetically distinct plant in the same species in order to produce fruit and fertile seed[11, 200]. The flowers are deliciously scented[245]. A polymorphic species[11]. The sub-species *V. erubescens gracilipes*. Rehd. fruits freely in Britain[11].

6.2.230 Pseudosasa japonica

Metake - Bamboo

5 tlin 9 cyuc 2 kcak 0 tcan 1 dwat 4.5 m hkuc pcmhmimhtut cyutli tcuphja7n hwicli hyishrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Pseudosasa japonica is an evergreen Bamboo growing to 4.5 m (14ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist or wet soil. The plant can tolerate maritime exposure.

pcista Shoots may contain toxic cyanogens (removed by cooking)[301]. Do not use during pregnancy [301].

kcakta Edible Parts: Seed StemEdible Uses: Young shoots - cooked[2, 105, 177]. Harvested in the late spring when about 8 - 10cm above ground level, cutting the stems 5cm or more below soil level. They have a rather bitter flavour[K]. Seed - used as a cereal[105]. Small quantities of seed are produced in many years but it is seldom viable.

tcanta Hedge Hedge Plant support Soil stabilization- Plants can be grown along the river edge to protect the banks from erosion[195]. Canes are fairly thin walled but make very good plant supports[25, 75, 195]. Smaller canes can be plaited together and used as screens or as lathes for walls and ceilings[195]. Tolerant of maritime exposure, it can be grown as a screen or windbreak hedge in very exposed positions[75, 166]. The culms make an excellent wind filter, slowing its speed without creating turbulence. The leaves may look somewhat tattered by the end of the winter but plants will soon produce new leaves[K].

dwatta Abortifacient Anthelmintic Antivinous Aphrodisiac Stimulant TonicAnthelmintic, antivinous, stimulant, tonic[178]. Used orally in Chinese medicine for asthma, coughs and gallbladder disorders. In India leaves are used for spasmodic disorders of the stomach and to arrest bleeding [301]. Leaves used as a aphrodisiac [301].

nrakta E. Asia - Japan. Frequently naturalized in Britain. ksacta Woodland and damp places, forming thickets in open country. C. and S. Japan[162].

propta Seed - if possible, surface sow the seed as soon as it is ripe in a greenhouse at about 20°c. Stored seed is best sown as soon as it is obtained. Do not allow the compost to dry out. Germination usually takes place fairly quickly so long as the seed is of good quality, though it can take 3 - 6 months. Prick out the seedlings when they are large enough to handle and grow them on in a lightly shaded place in the greenhouse until they are large enough to plant out, which might take a few years. Plants only flower at intervals of several years and so seed is rarely available. Division in late spring as new growth commences. Very easy, single canes of the current years growth can be used. Pot them up in light shade in a greenhouse. Make sure the foliage is not allowed to dry out - misting 2 - 3 times a day for the first couple of weeks following division can be very helpful. Plant out in the summer once they are growing away strongly. Cane layering in May. Detach individual canes and lay them horizontally in trenches 15cm deep. New shoots should arise from each joint. Rhizome cuttings.

nwatta One of the easiest bamboos to grow in Britain, it prefers an open loam of fair quality and a position sheltered from cold drying winds[1, 11, 29] but it tolerates maritime exposure[75, 166]. Succeeds on peaty soils[11]. Succeeds in soils that are half earth and half stone[195]. Requires abundant moisture and plenty of organic matter in the soil[200]. Endures near-saturated soil conditions[200]. Dislikes drought[1]. A very ornamental plant[1], it is said to be the hardest bamboo[25], tolerating temperatures down to about -15°c[200]. Down to -24°c according to another report. In warmer parts of Britain plants can attain a height of 6 metres or more. The rootstock is running and very invasive[25]. It is fairly easy to control, however, if any new shoots that are not wanted are broken off whilst they are still small and brittle. New shoots appear from April[25]. This species is notably resistant to honey fungus[200]. Plants often flower lightly for a number of years without dying out though they seldom produce viable seed[122]. Occasionally the plants can produce an abundance of flowers and this severely weakens, though does not usually kill, the plants. They can take some years to recover. If fed with artificial NPK fertilizers at this time the plants are more likely to die[122]. Many plants flowered heavily in the late 1980’s and are only slowly recovering.

6.2.231 Prunus salicina

Japanese Plum

5 tlin 8 cyuc 2 kcak 2 tcan 1 dwat 4 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Prunus salicina is a deciduous Tree growing to 4 m (13ft) by 3 m (9ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in April, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: Fruit SeedEdible Uses: Fruit - raw or cooked[46, 61, 105, 171]. The fruit ripens early[74]. A unique taste[74]. Sweet and juicy, it can be eaten out of hand, made into pies, preserves etc, or be dried for later use[183]. The fruit is very resistant to rotting[74]. The plum-shaped fruit is up to 7cm long and contains one large seed[200]. Seed - raw or cooked. Do not eat the seed if it is too bitter - see the notes above on toxicity.

tcanta DyeA green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168]. Wild populations of this species are primary genetic relatives of the cultivated Japanese Plum (*Prunus salicina*) and they also belong to the secondary Gene Pool of the Apricot (*Prunus armeniaca*), Myrobalan Plum (*Prunus cerasifera*) and Peach (*Prunus persica*). As a result, this species has the potential for use as a gene donor for crop improvement[338]. Espalier: tree or other plant that is trained to grow flat against a support (such as a trellis or wall).

dwatta StomachicThe fruit is stomachic[240]. It is said to be good for allaying thirst and is given in the treatment of arthritis[240]. Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta E. Asia - China. ksacta Sparse forests, forest margins, scrub, along trails in mountains, beside streams in valleys, thickets at elevations of 200 - 2600 metres[266].

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200]. Softwood cuttings from strongly growing plants in spring to early summer in a frame[200]. Layering in spring.

nwatta Thrives in a well-drained moisture-retentive loamy soil[11, 200]. Prefers some lime in the soil but is likely to become chlorotic if too much lime is present[1]. Succeeds in sun or partial shade though it fruits better in a sunny position[11, 200]. This species does not grow well in Britain, the summers are not warm enough to properly ripen the wood and the springs are too unpredictable for the flowers to be fertilized[11]. An important temperate fruit tree, it is widely cultivated in China and other regions of Asia for its edible fruit, and is being increasingly grown in N. America[266]. There are several named varieties[46, 58, 183]. This species does not cross-pollinate with the English plum, *P. domestica*[200]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features: Not North American native. All or parts of this plant are poisonous. Blooms are very showy. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A sprouting standard sending up shoots from the base [1-2].

6.2.232 Asparagus verticillatus

5 tlin 9 cyuc 2 kcaak 0 tcan 0 dwat 4 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli nyanhjen hjonli

drutta *Asparagus verticillatus* is a PERENNIAL growing to 4 m (13ft 1in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: StemEdible Uses: Young shoots - cooked[2, 105, 177].

nrakta Europe to W. Asia - Russia to Iran. ksacta Woody margins, scrub, stony places and shores[74].

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

nwatta Easily grown in any good garden soil[200]. Prefers a rich sandy loam[1]. Dormant plants are hardy to about -20°C[200]. The young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. Dioecious. Male and female plants must be grown if seed is required.

6.2.233 Zanthoxylum schinifolium

Peppertree

5 tlin 9 cyuc 2 kcaak 0 tcan 2 dwat 4 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli dyat hjonli

drutta *Zanthoxylum schinifolium* is a deciduous Shrub growing to 4 m (13ft 1in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August, and the seeds ripen in October. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

kcakta Edible Parts: LeavesEdible Uses: CondimentSeed - cooked. It is used as a condiment, a pepper substitute[151]. Young leaves[105]. No more details are given.

dwatta Anaesthetic Diuretic Parasiticide Stimulant Tonic VasodilatorThe pericarp is anaesthetic, diuretic, parasiticide and vasodilator[176]. It is used in the treatment of gastralgia and dyspepsia due to cold with vomiting, diarrhoea, abdominal pain, ascariasis and dermal diseases[176]. It has a local anaesthetic action and is parasiticide against the pork tapeworm (*Taenia solium*) [176]. The pericarp contains geraniol. In small doses this has a mild diuretic action, though large doses will inhibit the excretion of urine[176]. There is a persistent increase in peristalsis at low concentration, but inhibition at high concentration[176]. The resin contained in the bark, and especially in that of the roots, is powerfully stimulant and tonic[82].

nrakta E. Asia - China, Japan, Korea. ksacta Low mountains, C. and S. Japan[58]. Roadides in Korea[151].

propta Seed - best sown in a greenhouse as soon as it is ripe in the autumn. Stored seed may require up to 3 months cold stratification, though scarification may also help[113]. Sow stored seed in a cold frame as early in the year as possible. Germination should take place in late spring, though it might take another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant them out in early summer. Cuttings of half-ripe wood, July/August in a frame. Root cuttings, 3cm long, planted horizontally in pots in a greenhouse. Good percentage[78]. Suckers, removed in late winter and planted into their permanent positions[113].

nwatta Uses: Clearstem tree, multi-stem tree, specimen tree, specimen shrub; Parks, tree containers, cemeteries, roof gardens, large gardens. Prefers a good deep well-

bers to be formed. The tuber should be treated as being dormant, whilst the remaining plant should be encouraged to continue in growth in order to give it time to produce new tubers[230]. Division can also be carried out when the plant has a fully developed rosette of leaves but before it comes into flower[230]. The entire new growth is removed from the old tuber from which it has arisen and is potted up, the cut being made towards the bottom of the stem but leaving one or two roots still attached to the old tuber. This can often be done without digging up the plant. The old tuber should develop one or two new growths, whilst the new rosette should continue in growth and flower normally[230].

nwatta Plants can be grown in a lawn, but the lawn must not be cut until the plants have set seed[200]. Plants are best grown in a shady position[188]. Grows well in a sunny dry border or on a scree[230]. Orchids are, in general, shallow-rooting plants of well-drained low-fertility soils. Their symbiotic relationship with a fungus in the soil allows them to obtain sufficient nutrients and be able to compete successfully with other plants. They are very sensitive to the addition of fertilizers or fungicides since these can harm the symbiotic fungus and thus kill the orchid[230]. This symbiotic relationship makes them very difficult to cultivate, though they will sometimes appear uninvited in a garden and will then thrive. Transplanting can damage the relationship and plants might also thrive for a few years and then disappear, suggesting that they might be short-lived perennials[230]. A very rare species in Britain, where it is on the verge of extinction, it is rather more common in southern Europe[230]. The flowers resemble a female insect and also emit a scent similar to female pheromones, they are pollinated by a male insect of that species attempting to copulate with the flower[200]. Tubers should be planted out whilst they are dormant, this is probably best done in the autumn[200]. They should be planted at least 5cm below soil level[200].

6.2.308 Panax ginseng

Ginseng, Chinese ginseng

5 tlin 9 cyuc 2 kcaak 0 tcan 5 dwat 0.8 m hkuc pcmhmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Panax ginseng* is a PERENNIAL growing to 0.8 m (2ft 7in) by 0.7 m (2ft 4in). See above for USDA hardiness. It is hardy to UK zone 6. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

pcista Side effects include inability to fall asleep, increase in heart rate and blood pressure. Overuse or prolonged use may cause over stimulation (diarrhoea, nervousness, skin eruption). Caution with other stimulants needed. Avoid in patients with psychosis and manic disorders. Not recommended during pregnancy and breast feeding[301].

kcakta Edible Parts: RootEdible Uses: TeaRoot - chewed. This probably refers to its medicinal uses. A tea is made from the root.

dwatta Adaptogen Antianxiety Anticholesterolemic Appetizer Emetic Expectorant Hypoglycaemic Nervine Tonic-Ginseng has a history of herbal use going back over 5,000 years[238]. It is one of the most highly regarded of herbal medicines in the Orient, where it has gained an almost magical reputation for being able to promote health, general body vigour and also to prolong life[218]. The root is adaptogen, alterative, carminative, demulcent, emetic, expectorant, stimulant and tonic[165, 176, 178, 218]. It both stimulates and relaxes the nervous system, encourages the secretion of hormones, improves stamina, lowers blood sugar and cholesterol levels and increases resistance to disease[238]. It is used internally in the treatment of debility associated with old age or illness, lack of appetite, insomnia, stress, shock and chronic illness[238]. Ginseng is not normally prescribed for pregnant women, or for patients under the age of 40, or those with depression, acute anxiety or acute inflammatory disease[238]. It is normally only taken for a period of 3 weeks[238]. Excess can cause headaches, restlessness, raised blood pressure and other side effects, especially if it is taken with caffeine, alcohol, turnips and bitter or spicy

foods[238]. The roots are harvested in the autumn, preferably from plants 6 - 7 years old, and can be used fresh or dried[238]. A dose of 10ug/ml of ginseng saponins has been shown to be significantly radio-protective when it is administered prior to gamma-irradiation[218]. The leaf is emetic and expectorant[218]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve *Panax ginseng* for lack of stamina (see [302] for critics of commission E).

nrakta E. Asia - China, Korea. ksacta Mountain forests[165, 178].

propta Seed - sow in a shady position in a cold frame preferably as soon as it is ripe, otherwise as soon as the seed is obtained. It can be very slow and erratic to germinate. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a shady position in the greenhouse or frame for at least their first winter. Make sure the pots are deep enough to accommodate the roots. Plant out into their permanent positions in late summer. Division in spring.

nwatta Requires a moist humic rich soil in a shady position in a woodland[200]. Ginseng is widely cultivated and also collected from the wild in the Orient for its root which is commonly used as a medicine[178]. The root is prepared in a number of different ways, including by steaming it for 4 hours in wicker baskets over boiling water[200].

6.2.309 Tanacetum parthenium

Feverfew, Matricaria

5 tlin 8 cyuc 2 kcaak 2 tcan 5 dwat 0.6 m hkuc htat cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyfkrx7t hjonli

drutta *Tanacetum parthenium* is a PERENNIAL growing to 0.6 m (2ft) by 0.3 m (1ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate strong winds but not maritime exposure.

pcista Do not use during pregnancy or with coagulation problems. Oral ulcers (apothous ulcers in 5-15%) and/or gastrointestinal disturbances. Discontinuation may lead to rebound headaches, anxiety and insomnia [301].

kcakta Edible Parts: Edible Uses: Condiment teaThe dried flowers are used as a flavouring in cooking certain pastries[177, 183]. The plant is used in cooking to impart a deliciously aromatic bitter taste to certain foods[7]. A tea is made from the dried flowers[183].

tcanta Essential RepellentThe dried flower buds are a source of an insecticide. They are said to have the same properties as pyrethrum (obtained mainly from *T. cinerariifolia*) [61, 100, 201]. Steep 1 cupful of the dried flowers in one litre of hot soapy water for an hour. Strain, then allow to cool slightly before use[201]. An essential oil from the plant is used in perfumery[7].

dwatta Antiechymotic Antinflammatory Antirheumatic Antispasmodic Aperient Bitter Carminative Emmenagogue Sedative Stimulant Stings Stomachic Vasodilator Vermifuge-Feverfew has gained a good reputation as a medicinal herb and extensive research since 1970 has proved it to be of special benefit in the treatment of certain types of migraine headaches and rheumatism[238, K]. It is also thought of as a herb for treating arthritis and rheumatism[254]. The leaves and flowering heads are anti-inflammatory, antispasmodic, aperient, bitter, carminative, emmenagogue, sedative, stimulant, stings, stomachic, vasodilator and vermifuge[4, 7, 21, 36, 46, 53, 100, 165]. The plant is gathered as it comes into flower and can be dried for later use[7]. Use with caution[165], the fresh leaves can cause dermatitis and mouth ulcers if consumed[238]. This remedy should not be prescribed for pregnant women[238]. A tea made from the whole plant is used in the treatment of arthritis, colds, fevers etc. It is said to be sedative and to regulate menses[222, 238]. An infusion is used to bathe swollen feet[257]. Applied externally as a tincture, the plant is used in the treatment of

diness. It is hardy to UK zone 6 and is not frost tender. It is in flower from April to August, and the seeds ripen from June to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind, flies, bees. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitability pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Leaves SeedEdible Uses: Young leaves - raw or cooked[12, 46, 61]. They are rather bitter and very tedious to prepare, the fibrous strands are best removed prior to eating[9, 183]. The very young leaves are somewhat better and are less fibrous[K]. Seed - cooked. Used like sago[177, 183]. The seed can be ground into a powder and added to flours when making bread, cakes or whatever.

tcanta Dye Fibre StarchA good fibre is obtained from the leaves[4], it is said to be suitable for textiles[115]. A mucilage from the seed coats is used as a fabric stiffener[4]. It is obtained by macerating the seed in hot water[100, 115]. Gold and brown dyes are obtained from the whole plant[168]. Dynamic accumulator.

dwatta Antibacterial Antidote Astringent Demulcent Expectorant Haemostatic Laxative Ophthalmic PoulticeRibwort plantain is a safe and effective treatment for bleeding, it quickly staunches blood flow and encourages the repair of damaged tissue[254]. The leaves contain mucilage, tannin and silic acid[244]. An extract of them has antibacterial properties[240]. They have a bitter flavour and are astringent, demulcent, mildly expectorant, haemostatic and ophthalmic[9, 13, 21, 145, 165, 222, 244, 254]. Internally, they are used in the treatment of a wide range of complaints including diarrhoea, gastritis, peptic ulcers, irritable bowel syndrome, haemorrhage, haemorrhoids, cystitis, bronchitis, catarrh, sinusitis, asthma and hay fever[238, 254]. They are used externally in treating skin inflammations, malignant ulcers, cuts, stings etc[4]. The heated leaves are used as a wet dressing for wounds, swellings etc[213, 222]. The root is a remedy for the bite of rattlesnakes, it is used in equal portions with *Marrubium vulgare*[207]. The seeds are used in the treatment of parasitic worms[213]. Plantain seeds contain up to 30% mucilage which swells up in the gut, acting as a bulk laxative and soothing irritated membranes[238]. Sometimes the seed husks are used without the seeds[238]. A distilled water made from the plant makes an excellent eye lotion[7].

nrakta Europe, including Britain, from Iceland south and east to Spain, northern and central Asia. ksacta Grassland, roadsides etc, a common weed of lawns and cultivated ground, on neutral and basic soils[9, 17].

propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in early summer. A sowing can be made outdoors in situ in mid to late spring if you have enough seeds.

nwatta Succeeds in any moderately fertile soil in a sunny position[200]. Plants also succeed in very poor land[4]. An important food plant for the caterpillars of many species of butterflies[30]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fibrous dividing into a large number of fine roots [2-1].

6.2.306 Cardamine rotundifolia

American Water Cress, American bittercress

5 tlin 9 cyuc 2 kcaak 0 tcan 0 dwat 0.3 m hkuc hmimhtut cyutli tcuphja7nhs6s hwicli hrasjlutnyik hpa7tli flatprikklwis hpa7tmwatli fyifxre7t hjonli

drutta Cardamine rotundifolia is a PERENNIAL growing to 0.3 m (1ft) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from April to August, and the seeds ripen from May to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitability pH: mildly

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

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked[105, 161, 177]. A hot water-cress like flavour[2, K].

nrakta Eastern N. America - New York to Ohio, Missouri, North Carolina and Kentucky. ksacta Cold springs and brooksides[43, 235].

propta Seed - sow spring in a cold frame. Germination usually takes place within 1 - 3 weeks at 15°c[175]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in a greenhouse or cold frame for the first two years, planting them out when dormant in late summer. Division in early spring or after the plant dies down in the summer. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Succeeds in most soils so long as they are not dry[1]. Grows wild in shallow water[235]. Prefers a moist humus rich soil in shade or semi-shade[200]. A mat-forming stoloniferous species[200].

6.2.307 Ophrys holoserica

Late Spider Orchid

5 tlin 9 cyuc 2 kcaak 0 tcan 2 dwat 0.6 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatprikklwis hpa7tmwatli xre7t hjonli

drutta Ophrys holoserica is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf from October to July, in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitability pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: RootEdible Uses: Root - cooked. It is a source of 'salep', a fine white to yellowish-white powder that is obtained by drying the tuber and grinding it into a powder[200]. Salep is said to be very nutritious and is made into a drink or added to other cereals and used in bread etc[183]. One ounce of salep is said to be enough to sustain a person for a day[100, 115]. The salep can also be made into a drink[100].

dwatta Demulcent NutritiveSalep (see above for more details) is very nutritive and demulcent[4]. It has been used as a diet of special value for children and convalescents, being boiled with water, flavoured and prepared in the same way as arrowroot[4]. Rich in mucilage, it forms a soothing and demulcent jelly that is used in the treatment of irritations of the gastro-intestinal canal[4]. One part of salep to fifty parts of water is sufficient to make a jelly[4]. The tuber, from which salep is prepared, should be harvested as the plant dies down after flowering and setting seed[4].

nrakta Central and southern Europe, including Britain, to the Near East. ksacta Very rare and local on chalk downs and field borders in S. E. England[17].

propta Seed - surface sow, preferably as soon as it is ripe, in the greenhouse and do not allow the compost to dry out. The seed of this species is extremely simple, it has a minute embryo surrounded by a single layer of protective cells. It contains very little food reserves and depends upon a symbiotic relationship with a species of soil-dwelling fungus. The fungal hyphae invade the seed and enter the cells of the embryo. The orchid soon begins to digest the fungal tissue and this acts as a food supply for the plant until it is able to obtain nutrients from decaying material in the soil[200]. It is best to use some of the soil that is growing around established plants in order to introduce the fungus, or to sow the seed around a plant of the same species and allow the seedlings to grow on until they are large enough to move. This species only rarely forms new offsets and so division is seldom feasible, the following methods can be tried, however[230]. Division of the tubers as the flowers fade[230]. This species produces a new tuber towards the end of its growing season. If this is removed from the plant as its flowers are fading, the shock to the plant can stimulate new tu-

drained moisture retentive soil in full sun or semi-shade[1, 11, 200]. Flowers are formed on the old wood[206]. Dioecious. Male and female plants must be grown if seed is required. Self-sown seedlings have occasionally been observed growing in bare soil in the shade of the parent plant[K].

6.2.234 Calycanthus floridus glaucus

Eastern Sweetshrub

5 tlin 9 cyuc 2 kcaak 0 tcan 1 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikklwis hpa7tmwatli xre7t hjonli

drutta Calycanthus floridus glaucus is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to July, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitability pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Some reports say that the fruits are poisonous to sheep[235]. Calycanthus contains calycanthine, an alkaloid similar to strychnine, and it is toxic to humans and livestock[270].

kcakta Edible Parts: Edible Uses: CondimentThe leaves, root and bark are dried and used as a substitute for cinnamon[177]. Some caution is advised, see reports above on toxicity[270].

dwatta Diuretic Emmenagogue UrinaryEmmenagogue[61]. An infusion of the bark has been used to treat urinary problems[257].

nrakta South-eastern N. America - Pennsylvania to North Carolina, Tennessee, Georgia and Alabama. ksacta Rich woodlands[43]. Deciduous or mixed woodlands, along streams and rivers, margins of woodlands from sea level to 1850 metres[270].

propta Seed - best sown in a cold frame as soon as it is ripe. If the seed is harvested 'green' (as soon as it has fully developed but before it has dried on the plant) and sown immediately it can germinate in 3 weeks[113]. Dried seed germinates in 1 - 6 months at 15°c[138]. Stored seed requires between 3 weeks and 3 months cold stratification before sowing in the spring. When large enough to handle, prick out the seedlings into individual pots and grow them on in the greenhouse for their first winter. Plant out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. They can be difficult[113]. Layering in spring. Sever the new plants in a wet spell of weather about 15 months later and then lift them in the autumn[78]. High percentage[78]. Division of suckers in early spring[11]. Very easy, they can be planted straight out into their permanent positions if required.

nwatta Prefers a light loamy soil that is deep and moist but it succeeds in most fertile soils[11, 182]. Prefers a sunny position but it tolerates shade when grown in warm temperate zones[11, 200]. Requires a sheltered position, protected from cold winds[245]. A very ornamental plant, it is often confused with the closely related *C. floridus* and is perhaps no more than a sub-species of that species[11]. The leaves smell strongly of cinnamon[245]. The seed only ripens in Britain after a hot summer[11]. Plants in this genus are notably resistant to honey fungus[200].

6.2.235 Berberis amurensis

5 tlin 9 cyuc 2 kcaak 0 tcan 2 dwat 3.5 m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyikfrp hpa7tli flatprikklwis hpa7tmwatli fyifxre7t hjonli

drutta Berberis amurensis is a deciduous Shrub growing to 3.5 m (11ft 6in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitability pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit - cooked. Used in preserves[177]. The oblong fruit is about 10mm long[200]. Leaves[177]. No more details.

tcanta Hedge HedgePlants are very amenable to trimming and can be grown as an almost impenetrable formal or informal hedge[200].

dwatta Antibacterial Antirheumatic Cancer Dysentery-The root is antirheumatic[218]. Berberine, universally present in rhizomes of Berberis species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with *Glycyrrhiza* species (Licorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta E. Asia. ksacta Thickets, edges of woods and banks of streams in Korea and Manchuria[67].

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78]. Layering.

nwatta Prefers a warm moist loamy soil and light shade but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. This species is closely allied to *B. vulgaris*, it hybridizes freely with other members of the genus[1]. There are some named forms selected for their ornamental value[200]. Plants can be pruned back quite severely and will resprout well from the base[200].

6.2.236 Chimonobambusa quadrangularis

Square Bamboo

5 tlin 9 cyuc 2 kcaak 0 tcan 0 dwat 3 m hkuc hmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikklwis hpa7tmwatli xre7t hjonli

drutta Chimonobambusa quadrangularis is an evergreen Bamboo growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitability pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: StemEdible Uses: Young shoots - cooked. An excellent relish. The canes are up to 20mm in diameter[K].

tcanta Hedge Hedge Plant support WoodThe canes make good plant supports and are excellent material for handicrafts[195]. Can be grown as a hedge or screen[200].

nrakta E. Asia - S.E. China, Formosa. Naturalized in south-western England. ksacta Forests.

propta Seed - surface sow as soon as it is ripe in a greenhouse at about 20°c. Do not allow the compost to dry out. Germination usually takes place fairly quickly so long as the seed is of good quality, though it can take 3 - 6 months. Grow on in a lightly shaded place in the greenhouse until large enough to plant out. Seed is rarely available. Division in spring as new growth commences. Take divisions with at least three canes in the clump, trying to cause as little root disturbance to the main plant as possible. Grow them on in light shade in a greenhouse in pots of a high fertility sandy medium. Mist the foliage regularly until plants are established. Plant them out into their permanent positions when a good root system has developed, which can take a year or more[200]. Basal cane cuttings. Rhizome cuttings.

nwatta Prefers a good loamy soil. Succeeds in most soils so long as they do not dry out. Dislikes drought. Prefers a position sheltered from cold north and east winds. Plants are only reliably hardy in the mildest areas of Britain. Another report says that the plants are generally hardy, although severe winters may damage the leaves the plant itself can withstand temperatures down to about -15°c[200]. The square bamboo is cultivated for its edible stems in China and Japan. This species is notably resistant to honey fungus[200]. Plants only flower at intervals of many years. When they do come into flower most of the plants energies are directed into producing seed and consequently the plant is severely weakened. They sometimes die after flowering, but if left alone they will usually recover though they will look very poorly for a few years. If fed with artificial NPK fertilizers at this time the plants are more likely to die[122]. The rootstock is running but it does not produce many new shoots and is not overly invasive[195]. The plant is rampant in its native range and other warm temperate areas, but it does not spread much in colder areas such as Britain[200]. The shoots are wide spaced and are produced from late May. Canes can be snapped off the plant. A plant at Trehab gardens in Cornwall had new shoots 3 metres long in mid-April 1995[K].

6.2.237 Eleutherococcus divaricatus

5 tin 9 cyuc 2 kcaak 0 tcan 0 dwat 3.5 m hkuc hmimhtut cyutli tcup hwicli hyhisrasjlutnyik hpa7tli flatprik-lwis hpa7tmwatli xre7t hjonli

drutta Eleutherococcus divaricatus is a deciduous Shrub growing to 3.5 m (11ft 6in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from August to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. It can tolerate atmospheric pollution.

kcakta Edible Parts: LeavesEdible Uses: Condiment TeaLeaves - cooked[105, 177]. They are parboiled, then dried and used as a winter vegetable[183]. The leaves are used as a condiment[183]. The dried leaves are a tea substitute[177, 183].

nrakta E. Asia - Japan. ksacta A rather rare plant, growing in the mountains all over Japan[58, 275].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame[200]. It can be slow to germinate. Stored seed requires 6 months warm followed by 3 months cold stratification[113] and can be very slow to germinate[133]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for at least the first winter. Plant out in late spring or early summer. Cuttings of half-ripe wood, July/August in a frame[113, 200]. Cuttings of ripe wood of the current season's growth, 15 - 30cm long in a cold frame[238]. Root cuttings in late winter[200]. Division of suckers in the dormant season[200].

nwatta Succeeds in an open loamy soil[1], preferring a well-drained humus-rich soil in full sun[200]. Tolerates poor soils and atmospheric pollution[200]. Plants are hardy to at least -10 to -15°c if they are sheltered from cold winds[200]. A spineless form, *Eleutherococcus divaricatus inermis* (Nakai) H. Ohashi, has been reported[275].

6.2.238 Berberis parispala

5 tin 9 cyuc 2 kcaak 0 tcan 2 dwat 3 m hkuc hmimhtut cyutli kyuctup hwicli hyhisrasjlutnyikfrip hpa7tli flatprik-lwis hpa7tmwatli fyifxre7t hjonli

drutta *Berberis parispala* is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: FruitEdible Uses: The following report is for the closely related *B. angulosa* - it quite possibly can also be applied to this species[K]. Fruit - raw or cooked. The relatively large berries are freely borne and are more palatable than most barberries. The fruit is about 15mm long and 8mm wide[200].

tcanta DyeA yellow dye is obtained from the root.

dwatta Antibacterial Cancer DysenteryBerberine, universally present in rhizomes of *Berberis* species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with *Glycyrrhiza* species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta E. Asia - Himalayas in northern Assam, northeastern India, Nepal, Sikkim and eastern Tibet. ksacta In the subalpine to alpine zone, growing on rocky slopes and scree.

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78]. Layering.

nwatta Prefers a warm moist loamy soil but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. Succeeds in full sun or light shade[200]. Plants can be pruned back quite severely and will resprout well from the base[200]. This species comes into leaf very early in the spring[11]. Hybridizes freely with other members of this genus[1]. This species is closely related to *B. angulosa*[200].

6.2.239 Dioscorea villosa

Wild Yam

5 tin 9 cyuc 2 kcaak 0 tcan 4 dwat 3 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik-lwis hpa7tmwatli nyanhjen hjonli

drutta *Dioscorea villosa* is a PERENNIAL CLIMBER growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from September to October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). . The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista Edible species of *Dioscorea* have opposite leaves whilst poisonous species have alternate leaves[174]. Use of the fresh plant can cause vomiting and other side effects[222]. Known to cause headaches, menstrual irregularities and acne. May cause hair loss and oily skin. Avoid during pregnancy. Avoid in patients with cancers of the breast, ovaries, prostate and uterus [301].

kcakta Edible Parts: RootEdible Uses: Tuber - cooked[177]. Some caution should be exercised with this plant. See 'Medicinal Uses' for more information.

dwatta Antiinflammatory Antirheumatic Antispasmodic Cholagogue Contraceptive Diaphoretic Homeopathy VasodilatorWild yam roots, and the roots of many other members of the genus, contains diosgenin[222]. This is widely used in modern medicine in order to manufacture progesterone and other steroid drugs. These are used as contraceptives and in the treatment of various disorders of the genitatory organs as well as in a host of other diseases such as asthma and arthritis[222, 254]. The roots are anti-inflammatory, antispasmodic, cholagogue, diaphoretic and vasodilator[165,

tcanta Essential RepellentAn essential oil in the leaves contains a phenol and a citral[4]. No more information is given, though the oil is likely to have medicinal activity and perhaps be suitable for perfumery etc[K]. The essential oil citronellal, used as an insect repellent and in perfumery, is obtained from this plant[274].

nrakta Central and Southern N. America to Mexico. ksacta Limestone barrens and slopes[43]. Prairies, savannahs and roadsides in Texas[274].

propta Seed - sow mid to late spring in a cold frame. Germination usually takes place within 10 - 40 days at 20°c. When large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in early summer. The seed can also be sown in situ in late summer in areas where the winters are not too severe and will produce larger plants. Cuttings of soft basal shoots in spring. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer. Division in spring or autumn.

nwatta Landscape Uses:Border, Massing, Specimen. An easily grown plant, succeeding in ordinary garden soil so long as it is not too dry[1]. Requires a moist soil and a sunny position[1, 200]. Likes some shade. Prefers a sandy rather acidic soil[200]. This species is closely related to *M. pectinata*[235]. Said to be a perennial in some books and an annual in others, it has acted as an annual with us so far[K]. A good bee plant[200]. Subject to mildew in dry summers[200]. Special Features: Attracts birds, North American native, Edible, Fragrant foliage, Attracts butterflies.

6.2.303 Fragaria nubicola

Indian Strawberry

5 tin 9 cyuc 2 kcaak 0 tcan 1 dwat 0.2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik-lwis hpa7tmwatli xre7t hjonli

drutta *Fragaria nubicola* is a PERENNIAL growing to 0.2 m (0ft 8in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from April to May, and the seeds ripen from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw[272]. A very pleasant strawberry flavour[K].

dwatta AstringentThe juice of the plant is used in the treatment of profuse menstruation[272]. The unripe fruit is chewed to treat blemishes on the tongue[272].

nrakta E. Asia - Himalayas from Kashmir to western China. ksacta Open grassland at elevations of 1600 - 4000 metres in Nepal[272]. Meadows on mountain slopes, forests in valleys and forest edge at elevations of 2500 - 3900 metres[266].

propta Seed - sow early spring in a greenhouse. The seed can take 4 weeks or more to germinate. The seedlings are very small and slow-growing at first, but then grow rapidly. Prick them out into individual pots when they are large enough to handle and plant them out during the summer. Division of runners, preferably done in July/August in order to allow the plants to become established for the following years crop[200]. They can also be moved in the following spring if required, though should not then be allowed to fruit in their first year. The runners can be planted out direct into their permanent positions.

nwatta We have very little information on this species and do not know if it will be hardy in Britain. However, judging by its native range, it is likely to succeed outdoors in many areas of the country. The following notes are based on the general needs of the genus. Prefers a fertile, well-drained, moisture retentive soil in a sunny position[200]. Tolerates semi-shade though fruit production will be reduced[38]. Likes a mulch of pine or spruce leaves[18, 24].

6.2.304 Centranthus ruber

Red Valerian, Fox's Brush, Jupiter's Beard
5 tin 8 cyuc 2 kcaak 1 tcan 1 dwat 0.9 m hkuc htut cyutli hgatyuctup hwicli hrisrasjlutnyik hpa7tli flatprik-lwis hpa7tmwatli xre7t hjonli

drutta *Centranthus ruber* is a PERENNIAL growing to 0.9 m (3ft) by 0.6 m (2ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

kcakta Edible Parts: Leaves RootEdible Uses: Young leaves - raw or cooked as greens[2, 5, 52, 115]. Exceedingly good, either in salads or cooked as a vegetable[4]. This differs from our own experience, whilst the leaves can be added to salads they are rather bitter and rather less than desirable[8, 183, K]. Root - cooked[4]. Used in soups[4].

tcanta MiscellanyThe seeds were used in ancient embalming[89, 148].

dwatta Miscellany NervineRed valerian is sometimes confused in herbals and folk tradition with the true valerian (*Valeriana officinalis*). Whilst true valerian has a very strong action on the nervous system, this species has no known medical properties[244, 268]. The plant is nervine[148]. This report possibly confuses this plant with the true valerian, *Valeriana officinalis*, which is a very effective nervine.

nrakta Europe. Naturalized in Britain[17]. ksacta Waste land, rocks, old walls etc[4]. Prefers alkaline conditions[268].

propta Seed - sow February to May in situ or as soon as it is ripe in situ and only just cover the seed. Germination is usually rapid. Division in spring. Cuttings, summer, in a cold frame.

nwatta Landscape Uses:Border, Ground cover, Massing, Rock garden, Seashore. Grows well in ordinary moist, well-drained garden soil and on dry walls[1, 111, 200]. Prefers a sunny position[111], though it also succeeds in semi-shade[219]. Thrives on chalk[200], poor soils[188] and in sandy soils[187]. Established plants are drought tolerant[190]. This species is hardy to about -15°c[187, 200]. Plants are generally long-lived and grow especially well in maritime areas, where they are a common feature of hedgerows and walls[219, K]. A very ornamental plant[1], it attracts moths and butterflies[30]. The flowers have an unpleasant smell like perspiration[245]. Special Features: Attracts birds, Attractive foliage, Not North American native, Naturalizing, Attracts butterflies, Suitable for cut flowers, Extended bloom season in Zones 9A and above, Fragrant flowers. The plant is heat tolerant in zones 8 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2].

6.2.305 Plantago lanceolata

Ribwort Plantain, Narrowleaf plantain

5 tin 9 cyuc 2 kcaak 3 tcan 3 dwat 0.5 m hkuc htut cyutli kyuctup hwicli hyhisrasjlutnyik hpa7tli flatprik-lwis hpa7tmwatli fyifxre7t hjonli

drutta *Plantago lanceolata* is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.2 m (0ft 8in). See above for USDA har-

6.2.299 Rheum compactum

5 tlin 9 cyuc 2 kcaak 0 tcan 0 dwat 0.5 m hkuc hmimhtut cyutli tcup hwicli jlutnyikripr hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Rheum compactum is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been seen for this species, the leaves of some if not all members of this genus contain significant quantities of oxalic acid and should not be eaten in any quantity. Oxalic acid can lock up certain minerals in the body, especially calcium, leading to nutritional deficiency. The content of oxalic acid will be reduced if the plant is cooked. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Edible Parts: StemEdible Uses: Leaf stem - cooked[2, 74]. A tart flavour; it can be used as a rhubarb substitute[105].

nrakta E. Asia - China. ksacta Banks of rivers and brooks, valleys and slopes[74]. Slopes at elevations around 2000 metres in Tibet[266].

propta Seed - best sown in autumn in a shaded cold frame[200]. The seed can also be sown in spring in a cold frame. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse or cold frame for their first winter, planting them out in the spring. Division in early spring or autumn[1, 111]. Divide up the rootstock with a sharp spade or knife, making sure that there is at least one growth bud on each division. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Prefers a deep, fertile, moderately heavy, humus rich, moisture retentive, well-drained soil in sun or semi-shade[200]. Grows well in heavy clay soils. Hardy to about -20°C[200]. Plants in this genus seem to be immune to the predations of rabbits[233]. Hybridizes freely with other members of this genus[200].

6.2.300 Cirsium japonicum

No-Azami, Japanese thistle

5 tlin 9 cyuc 2 kcaak 2 tcan 2 dwat 0.9 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyfjxre7t hjonli

drutta Cirsium japonicum is a BIENNIAL/PERENNIAL growing to 0.9 m (3ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from August to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies), beetles. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Leaves Oil RootEdible Uses: Oil-Leaves - cooked[61, 105, 177]. Very palatable in the spring, they are used with the young roots[179].

tcanta OilThe seed of all species of thistles yields a good oil by expression[4]. No details of potential yields etc are given[K].

dwatta Antiinflammatory Diuretic Haemostatic Styp-ticThe roots are anti-inflammatory, diuretic and haemostatic[61, 147, 176, 178]. A decoction of the dried roots is used in the treatment of boils and carbuncles, acute appendicitis, uterine bleeding, haematuria, nose bleeds, haematemesis and traumatic bleeding[147]. The leaf is haemostatic and diuretic[218]. The stem is haemostatic[218].

nrakta E. Asia - Japan. ksacta Sunny slopes in lowlands and foothills, C. and S. Japan[58, 147].

propta Seed - sow early spring or autumn in situ. Germination usually takes place within 2 - 8 weeks at 20°C[164]. Division in spring or autumn.

nwatta An easily grown plant, succeeding in any ordinary garden soil in a sunny position[200]. Cultivated for cut flowers in Japan[58]. There are some named forms selected for their ornamental value[200]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fleshy. Thick or swollen - fibrous or tap root [2-1].

6.2.301 Asarum reflexum

5 tlin 9 cyuc 2 kcaak 0 tcan 0 dwat 0.2 m hkuc pcmhmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Asarum reflexum is a PERENNIAL growing to 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

pcista Although no reports of toxicity have been found for this plant, at least 3 other members of this genus have reports that the leaves are toxic[7, 19]. Some caution is therefore advised in the use of this plant.

kcakta Edible Parts: Edible Uses: CondimentThe underground stem is a ginger substitute. The root has a pungent, aromatic smell like mild pepper and ginger mixed, but more strongly aromatic[245]. It is usually harvested in the autumn[159, 177] and can be dried for later use[K].

nrakta Eastern N. America - Connecticut and New York to Iowa, Michigan, North Carolina and Kansas. ksacta Rich moist soils in woodlands, along the sides of streams and in river valleys, often forming large patches[43, 159, 235].

propta Seed - best sown in a cold frame as soon as it is ripe in the summer[134]. Stored seed will require 3 weeks cold stratification and should be sown in late winter[134]. The seed usually germinates in the spring in 1 - 4 or more weeks at 18°C[134]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for at least their first winter. Plant them out when large enough in late spring. Division in spring or autumn. Plants are slow to increase[200]. It is best to pot the divisions up and keep them in light shade in the greenhouse until they are growing away strongly.

nwatta Prefers a rich moist neutral to acid soil in woodland or a shady position in the rock garden[1, 200]. Plants are found on alkaline soils in the wild[43]. Plants are hardy to at least -15°C[200]. The flowers are malodorous and are pollinated by flies[200]. Plants often self-sow when growing in a suitable position[200].

6.2.302 Monarda citriodora

Lemon Bergamot, Lemon beebalm. Lemon Mint

5 tlin 9 cyuc 2 kcaak 0 tcan 0 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyfjxre7t hjonli

drutta Monarda citriodora is a ANNUAL/PERENNIAL growing to 0.6 m (2ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Condiment TeaLeaves - raw or cooked. They are used as a flavouring in salads and cooked foods[46, 105, 161, K] and also as a tea[183]. They have a pleasant lemon flavour[238].

238]. They are also a visceral relaxant[165]. This plant affords one of the best and fastest cures for bilious colic, it is especially helpful in treating the nausea of pregnant women[4] and has been used to ease the pain of childbirth[257]. It is also taken internally in the treatment of arthritis, irritable bowel syndrome, gastritis, gall bladder complaints, painful menstruation etc[238]. The root is harvested in the autumn and dried for later use[238]. The root should not be stored for longer than 1 year, since it is likely to lose its medicinal virtues[4]. Caution is advised in the use of the this plant, when taken fresh it can cause vomiting and other side effects[222]. The root, harvested in September, is used to make a homeopathic remedy[232]. Its main use is in the treatment of infant colic[232].

nrakta Eastern N. America - New England to Minnesota and Ontario, south to Virginia and Texas. ksacta Borders of bogs, swamps, marshes, river and lake margins, creek bottoms, sandy or rocky soils, moist or dry woods, hammocks, thickets, limestone or talus slopes, roadsides, sea level to 1500 m[270].

propta Seed - sow March to April in a sunny position in a warm greenhouse and only just cover. It germinates in 1 - 3 weeks at 20°C[175]. Prick out the seedlings as soon as they are large enough to handle and grow on in a greenhouse for their first year. Plant out in late spring as the plant comes into new growth. Basal stem cuttings in the summer[37]. Division in the dormant season, never when in growth[1]. The plant will often produce a number of shoots, the top 5 - 10 cm of the root below each shoot can be potted up to form a new plant whilst the lower part of the root can possibly be eaten[K]. Tubercles (baby tubers) are formed in the leaf axils. These are harvested in late summer and early autumn when about the size of a pea and coming away easily from the plant. They should be potted up immediately in individual pots in a greenhouse or cold frame. Plant out in early summer when in active growth[K].

nwatta An easily grown plant, succeeding in a fertile well-drained soil in a sunny position or light shade[200]. Prefers a rich light soil[1]. Plants are hardy to at least -15°C[238]. Plants produce tubercles (small tubers that are formed in the leaf axils of the stems), and can be propagated by this means[K]. A climbing plant that supports itself by twining around the branches of other plants[219]. This is a highly polymorphic species, some botanists dividing it up into several species[235, 270]. Dioecious. Male and female plants must be grown if seed is required.

6.2.240 Orixia japonica

5 tlin 9 cyuc 2 kcaak 0 tcan 1 dwat 3 m hkuc pcmhmimhtut cyutli kyucctup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Orixia japonica is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from April to May. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). . The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young leaves cooked[105, 177]. Aromatic with a pleasant spicy odour[11].

tcanta Hedge HedgeThe plant can be grown as a hedge[11]. It forms a dense light green barrier within 5 years[200].

dwatta FebrifugeThe plant is febrifuge[218].

nrakta E. Asia - China, Japan, Korea. ksacta Woods, scrub and on cliffs, to 1300 metres[184].

propta Seed - one report suggests sowing the seed outdoors in the spring[200]. If seed is in short supply we would recommend sowing it in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5 - 8cm with a heel, July/August in a frame[78]. Fair percentage[78]. Root cuttings, 3cm

long, December in a greenhouse. High percentage[78]. Removal of self-layered branches at any time in the dormant season[200].

nwatta Succeeds in any fertile soil in sun or part shade[182, 200]. Survives in fairly dry shady conditions[200]. The leaves have a foetid smell[184]. They are distinctly and pleasantly aromatic according to another report[182] whilst another says that they release an orange-like pungency when pressed[245]. Plants are hardy to about -15°C[184]. Dioecious, male and female plants must be grown if seed is required[182].

6.2.241 Berberis wallichiana

5 tlin 9 cyuc 2 kcaak 0 tcan 2 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Berberis wallichiana is a SHRUB growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 6. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Fruit - raw[272].

tcanta A yellow dye is obtained from the root.

dwatta DysenteryThe roots contain the alkaloids berberine, oxycanthine and umbellatine[283]. They are antibacterial and are used in Vietnam in the treatment of diarrhoea, dysentery, ophthalmia and dyspepsia[283]. Berberine, universally present in rhizomes of Berberis species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Licorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta E. Asia - Himalayas to China. ksacta Open ground at elevations of 2000 - 3400 metres in Nepal[272].

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Germination averages out at about 90%[98, 113]. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78]. Suckers, removed in late autumn/early winter and planted out in situ or potted up and planted out in late spring[3, 200].

nwatta Not known

6.2.242 Oplopanax japonicum

5 tlin 9 cyuc 2 kcaak 0 tcan 1 dwat 3 m hkuc pcmhmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Oplopanax japonicum is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in June. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil. The plant can tolerate maritime exposure.

pcista The plant is densely armed with spikes and these spikes are irritant[200]. Although no specific mention has been seen for this plant, it belongs to a genus where the species are usually rich in calcium oxylate, this is toxic and if consumed makes the mouth and digestive tract feel as though hundreds of needles are being stuck into it. However,

calcium oxylate is easily destroyed by thoroughly cooking or drying the plant.

ksakta Edible Parts: Leaves RootEdible Uses: Young shoots - peeled and then cooked[46, 61, 105, 106]. Only the very young shoots are used[172]. The roots can be chewed after peeling[105, 106, 161].

dwtata Analgesic Antiphlogistic Antirheumatic Hypoglycaemic TonicThe root bark and stems are analgesic, antiphlogistic, antirheumatic, hypoglycaemic and tonic[172].

nrakta E. Asia - Japan. ksakta Moist woods, especially by streams[11] and usually in rich soils[99].

propta Seed - best sown in a cold frame as soon as it is ripe in the autumn[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division of suckers in the dormant season. Root cuttings in a greenhouse in the winter[188].

nwtata Requires a cool moist soil[11, 200]. Prefers a position in light shade[182]. Prefers dense shade and is probably best if grown in moist woodland[1, 11]. Tolerates maritime exposure[200]. (Rather a strange report for a plant that needs to be grown in dense shade[K]) A very hardy plant, tolerating temperatures down to at least -15°C, but the young shoots in spring can be damaged by late frosts[11, 200]. It is therefore best not grown in a frost pocket[182]. This species used to be included in *O. horridus* as the Japanese form of that species, but it has recently (1991) been recognised as a distinct species[200]. A very ornamental plant, but it is densely armed with spikes[60]. It transplants easily and also tolerates pruning[200]. The leaves and stems are excessively spiny[182].

6.2.243 Rubus species

Hybrid Berries

5 tlin 9 cyuc 2 kcaak 0 tcan 0 dwat 3 m hkuc hmimhtut cyutli hgattcup hwicli hrasjlutnyik hpa7tli frusflat-prikliwslip hpa7tmwatli fyixre7t hjonli

drutta Rubus species is a deciduous Shrub growing to 3 m (9ft 10in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to September, and the seeds ripen from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects, Apomictic (reproduce by seeds formed without sexual fusion). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure.

ksakta Fruit - raw or cooked[200].

nrakta A range of garden hybrids. ksakta Not known in the wild.

propta Seed - requires stratification and is best sown in early autumn in a cold frame. Stored seed requires one month stratification at about 3°C and is best sown as early as possible in the year. Prick out the seedlings when they are large enough to handle and grow on in a cold frame. Plant them out into their permanent positions in late spring of the following year. This plant is a cultivar and will not breed true from seed. Cuttings of half-ripe wood, July/August in a frame[200]. Tip layering in July. Plant out in autumn. Division in early spring or just before leaf-fall in the autumn[200]. Plant them out direct into their permanent positions.

nwtata Easily grown in a good well-drained loamy soil[1, 11, 200]. Succeeds in acid and calcareous soils[186]. Succeeds in sun or semi-shade[1, 11, 200], though it fruits less well in the shade[202]. Established plants are drought resistant[132]. Hardy to about -15°C[202]. This species has biennial stems, it produces a number of new stems each year from the perennial rootstock, these stems fruit in their second year and then die[200]. Plants in this genus are notably susceptible to honey fungus[200].

6.2.244 Forestiera neomexicana

Wild Olive

5 tlin 9 cyuc 2 kcaak 0 tcan 0 dwat 3 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flat-prikliwis hpa7tmwatli hjonli

drutta Forestiera neomexicana is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from April to May, and the seeds ripen from July to September. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

ksakta Edible Parts: FruitEdible Uses: Fruit[105, 257]. Although only 4 - 8mm long[227], it has been suggested as a substitute for the true olive, *Olea europaea*[105, 177, 183].

tcanta MiscellanyPlants growing in the wild are used as indicators of underground water[257].

nrakta South-western N. America - Texas to New Mexico, west to California. ksakta Dry slopes and ridges below 2000 metres[71].

propta Seed - best sown as soon as it is ripe in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame[11, 200]. Easy. Cuttings of mature wood, November to February in a frame or sheltered outdoor bed.

nwtata Succeeds in most soils[1, 11, 182]. Requires a sunny position and a well-drained soil[200]. Tolerates dry sites[200]. Flowers are produced in the axils of the previous years leaves[227]. Plants do not fruit well in Britain, probably due to a lack of sunshine[11].

6.2.245 Rubus buergeri

5 tlin 9 cyuc 2 kcaak 0 tcan 0 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Rubus buergeri is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

ksakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177]. The fruit is about 25mm in diameter[200].

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

nrakta E. Asia - China, Japan, Korea. ksakta Broad-leaved forests, mixed forests in mountainous regions at low to medium elevations[266].

propta Seed - requires stratification and is best sown in early autumn in a cold frame. Stored seed requires one month stratification at about 3°C and is best sown as early as possible in the year. Prick out the seedlings when they are large enough to handle and grow on in a cold frame. Plant them out into their permanent positions in late spring of the following year. Cuttings of half-ripe wood, July/August in a frame[200]. Tip layering in July. Plant out in autumn. Division in early spring or just before leaf-fall in the autumn[200].

nwtata Easily grown in a good well-drained loamy soil in sun or semi-shade[1, 11, 200]. Plants in this genus are notably susceptible to honey fungus[200].

6.2.246 Fuchsia magellanica

Fuchsia, Hardy fuchsia

5 tlin 7 cyuc 2 kcaak 0 tcan 1 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Ophrys insectifera* is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies, bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

ksakta Edible Parts: RootEdible Uses: Root - cooked. It is a source of 'salep', a fine white to yellowish-white powder that is obtained by drying the tuber and grinding it into a powder[200]. Salep is said to be very nutritious and is made into a drink or added to other cereals and used in bread etc[183]. One ounce of salep is said to be enough to sustain a person for a day[100, 115]. The salep can also be made into a drink[100].

dwtata Demulcent NutritiveSalep (see above for more details) is very nutritive and demulcent[4]. It has been used as a diet of special value for children and convalescents, being boiled with water, flavoured and prepared in the same way as arrowroot[4]. Rich in mucilage, it forms a soothing and demulcent jelly that is used in the treatment of irritations of the gastro-intestinal canal[4]. One part of salep to fifty parts of water is sufficient to make a jelly[4]. The tuber, from which salep is prepared, should be harvested as the plant dies down after flowering and setting seed[4].

nrakta Europe, including Britain, from Norway south and east to the Mediterranean. ksakta Woods, copses, field borders, spoil slopes, banks and grassy hillsides on chalk or limestone and in fens[17].

propta Seed - surface sow, preferably as soon as it is ripe, in the greenhouse and do not allow the compost to dry out. The seed of this species is extremely simple, it has a minute embryo surrounded by a single layer of protective cells. It contains very little food reserves and depends upon a symbiotic relationship with a species of soil-dwelling fungus. The fungal hyphae invade the seed and enter the cells of the embryo. The orchid soon begins to digest the fungal tissue and this acts as a food supply for the plant until it is able to obtain nutrients from decaying material in the soil[200]. It is best to use some of the soil that is growing around established plants in order to introduce the fungus, or to sow the seed around a plant of the same species and allow the seedlings to grow on until they are large enough to move. This species only rarely forms new offsets and so division is seldom feasible, the following methods can be tried, however[230]. Division of the tubers as the flowers fade[230]. This species produces a new tuber towards the end of its growing season. If this is removed from the plant as its flowers are fading, the shock to the plant can stimulate new tubers to be formed. The tuber should be treated as being dormant, whilst the remaining plant should be encouraged to continue in growth in order to give it time to produce new tubers[230]. Division can also be carried out when the plant has a fully developed rosette of leaves but before it comes into flower[230]. The entire new growth is removed from the old tuber from which it has arisen and is potted up, the cut being made towards the bottom of the stem but leaving one or two roots still attached to the old tuber. This can often be done without digging up the plant. The old tuber should develop one or two new growths, whilst the new rosette should continue in growth and flower normally[230].

nwtata Plants can be grown in a lawn, but the lawn must not be cut until the plants have set seed[200]. Orchids are, in general, shallow-rooting plants of well-drained low-fertility soils. Their symbiotic relationship with a fungus in the soil allows them to obtain sufficient nutrients and be able to compete successfully with other plants. They are very sensitive to the addition of fertilizers or fungicides since these can harm the symbiotic fungus and thus kill the orchid[230]. This symbiotic relationship makes them very difficult to cultivate, though they will sometimes appear uninvited in a garden and will then thrive. Transplanting can damage the relationship and plants might also thrive for a few years and then disappear, suggesting that they might be short-lived perennials[230]. The flowers resemble a female insect and also emit a scent similar to female pheromones, they are pollinated by a male insect of that species attempting to copulate with the flower[200]. Plants are rather sparingly visited by bees and flies, setting seed only if visited[17]. Tubers should

be planted out whilst they are dormant, this is probably best done in the autumn[200]. They should be planted at least 5cm below soil level[200].

6.2.298 Lamium album

White Dead Nettle

5 tlin 9 cyuc 2 kcaak 3 tcan 3 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Lamium album is a PERENNIAL growing to 0.6 m (2ft) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from May to December, and the seeds ripen from July to December. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

ksakta Edible Parts: LeavesEdible Uses: TeaYoung leaves - raw or cooked[2, 5, 7, 13, 54]. They can be added to salads or mixed with other leaves and cooked as a potherb[183]. They can also be dried for later use[12]. The leaves are a good source of vitamin A[240]. A pleasant herb tea is made from the flowers[238].

tcanta The plant has a creeping rootstock and makes a good groundcover plant for woodland edges[24].

dwtata Antiflatulent Antispasmodic Astringent Cancer Cholagogue Depurative Diuretic Expectorant Homeopathy Hypnotic Ophthalmic Pectoral Resolvent Sedative Styptic Tonic Vasoconstrictor VulneryWhite dead nettle is an astringent and demulcent herb that is chiefly used as a uterine tonic, to arrest inter-menstrual bleeding and to reduce excessive menstrual flow. It is a traditional treatment for abnormal vaginal discharge and is sometimes taken to relieve painful periods[254]. The flowering tops are antispasmodic, astringent, cholagogue, depurative, diuretic, expectorant, haemostatic, hypnotic, pectoral, resolvent, sedative, styptic, tonic, vasoconstrictor and vulnerary[4, 7, 9, 13, 21, 46, 61, 165, 238, 240]. An infusion is used in the treatment of kidney and bladder complaints[9], diarrhoea, menstrual problems, bleeding after childbirth, vaginal discharges and prostatitis[238, 254]. Externally, the plant is made into compresses and applied to piles, varicose veins and vaginal discharges[7, 238, 254]. A distilled water from the flowers and leaves makes an excellent and effective eye lotion to relieve ophthalmic conditions[7]. The plant is harvested in the summer and can be dried for later use[9]. A homeopathic remedy is made from the plant[9]. It is used in the treatment of bladder and kidney disorders and amenorrhoea[9].

nrakta Europe, including Britain, from Scandinavia south and east to Spain, the Himalayas and Japan. ksakta Fields, hedgerows, woodland edges and clearings and moist waste ground[7, 9, 17].

propta Seed - this species usually self sows freely and should not require human intervention. When required it can be sown in situ as soon as it is ripe. Division in spring. Division succeeds at almost any time in the growing season[K]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwtata Landscape Uses:Ground cover. A very easily grown plant, it tolerates most soils and conditions[200]. Grows well in heavy clay soils. Prefers a sunny position, though it also does well in partial shade[238]. Plants are hardy to about -25°C[187]. The white dead nettle is too weedy to be grown in the flower garden, but it does well in the wild garden and self-sows when well sited[200]. Plants seem to be immune to the predations of rabbits[233]. A good bee plant[4, 24] and a good companion plant, helping any vegetables growing nearby[14, 18]. Special Features: Attractive foliage, Invasive, Suitable for cut flowers. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [2-1].

to *Taraxacum officinale* (Dandelion) in nutritional value[179]. Flower heads - pickled[177, 183].

dwatta Antiphlogistic Antispasmodic Aperient Astringent Cholagogue Diaphoretic Emmenagogue Homeopathy Skin Stimulant Vulnerary WartsThe leaves are diaphoretic[61, 240]. The flowers are said to be antispasmodic, emmenagogue and stimulant[240]. The plant seems to have similar therapeutic properties to pot marigold, *C. officinalis*[254]. These properties are:- Pot marigold is one of the best known and versatile herbs in Western herbal medicine and is also a popular domestic remedy[4, 254]. It is, above all, a remedy for skin problems and is applied externally to bites and stings, sprains, wounds, sore eyes, varicose veins etc[4, 254]. It is also a cleansing and detoxifying herb and is taken internally in treating fevers and chronic infections[4, 254]. Only the common deep-orange flowered variety is considered to be of medicinal value[4]. The whole plant, but especially the flowers and the leaves, is antiphlogistic, antiseptic, antispasmodic, aperient, astringent, cholagogue, diaphoretic, emmenagogue, skin, stimulant and vulnerary[4, 7, 9, 21, 46, 165, 201]. The leaves can be used fresh or dried, they are best harvested in the morning of a fine sunny day just after the dew has dried from them[4]. The flowers are also used fresh or dried, for drying they are harvested when fully open and need to be dried quickly in the shade[4]. A tea of the petals tones up the circulation and, taken regularly, can ease varicose veins[201]. An application of the crushed stems to corns and warts will soon render them easily removable[7]. The leaves, blossoms and buds are used to make a homeopathic remedy[232]. It is used internally in order to speed the healing of wounds[232].

nrakta Europe. A garden escape in Britain[17]. ksacta Fields, vineyards and waste ground[89].

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

nwatta An easily grown and very ornamental plant, it succeeds in any well-drained soil[200], though it prefers a good loam and does best in a sunny or at least partially sunny position[4, 15, 200]. The plant flowers best when it is grown in a poor soil. Plants usually self-sow quite freely in the garden.

6.2.295 Epimedium sagittatum

Yin Yang Huo

5 tlin 9 cyuc 2 kcaak 0 tcan 3 dwat 0.5 m hkuc hmim cyutli kyuctcp hwicli hrasjutnyik hpa7tli flatprikliwis hpa7tmwatli dyatxre7t hjonli

drutta Epimedium sagittatum is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers dry or moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young plant and young leaves - cooked[105]. Soaked and then boiled[177]. (This suggests that the leaves are bitter and need to be soaked in order to remove the bitterness.)

tcanta A good ground cover plant[200].

dwatta Antirheumatic Aphrodisiac Carmineate Expecto- rant Infertility Kidney Ophthalmic Tonic VasodilatorThe whole plant is antirheumatic, aphrodisiac, carmineate, expecto- rant, ophthalmic and vasodilator. Used as a kidney tonic, it also treats sterility and barrenness[147, 178, 238]. It is taken internally in the treatment of asthma, bronchitis, cold or numb extremities, arthritis, lumbago, impotence, involuntary and premature ejaculation, high blood pressure and absentmindedness[238]. It should be used with some caution since in excess it can cause vomiting, dizziness, thirst and nosebleeds[238]. The plant is harvested in the growing season and dried for later use[238].

nrakta E. Asia - China. ksacta Hillsides in damp shady bamboo groves or in cliff crevices[147]. Moist woodlands[238].

propta Seed - best sown in a cold frame as soon as it is ripe in late summer[200, 280]. Sow stored seed as early as possible in the year in a cold frame. Prick out the seedlings

into individual pots when they are large enough to handle and grow them on in light shade in the cold frame or greenhouse for at least their first winter[K]. Plant them out in mid to late summer[K]. Division in July/August according to one report, in late spring according to another[200]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring. Cuttings in late summer[200].

nwatta Succeeds in any fertile humus-rich soil[200], preferring a moist but well-drained peaty loam[1, 280]. Grows best in the light dappled shade of a woodland[200, 280]. Plants can succeed in the dry shade of trees[233]. A shallow-rooting plant, the rhizomes creeping just below the soil and the finer roots occupying the top 30cm of the soil[280]. Although the plants are hardy to at least -15°C, the young growth in spring can be killed by frosts[238]. Grows well in the rock garden or wild garden[1]. Plants are self-sterile and so more than one clone is required for cross-fertilization in order for seed to be produced. Plants will often hybridise with other species growing nearby[280]. Cultivated as a medicinal plant in Japan[58]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233].

6.2.296 Sinapis arvensis

Charlock, Charlock mustard, Wild mustard
5 tlin 9 cyuc 2 kcaak 0 tcan 1 dwat 0.8 m hkuc htut cyutli tcup hwicli hrasjutnyikfrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Sinapis arvensis is a ANNUAL growing to 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from May to July, and the seeds ripen from May to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

pcista The plant is possibly poisonous once the seedpods have formed[76].

kcakta Edible Parts: Flowers Leaves Oil Oil SeedEdible Uses: Condiment Oil OilLeaves - raw or cooked[2, 4, 5, 12, 74]. Somewhat hot, the young leaves are used as a flavouring in salads, where they add a piquant flavour[9, 183]. Older leaves are used as a potherb[183]. It is best to use just the young shoots and leaves in the spring, older leaves are bitter[9]. Flowering stems - cooked[9, 74]. A pleasant, cabbage/radish flavour, they can be used as a broccoli substitute before the flowers open[183]. The stems should be lightly steamed for no more than 5 minutes[9]. The flowers can also be cooked as a vegetable or used as a garnish[183]. Seed - it can be sprouted and eaten raw[12]. A hot flavour, it can be added to salads and sandwiches[183]. The seed can be ground into a powder and used as a food flavouring. It has a hot mustard flavour[4, 9, 46, 115]. An edible oil is obtained from the seed[1, 57, 74].

tcanta Oil OilAn edible semi-drying oil is obtained from the seed. It is also used in making soap[74] and burns well so can be used for lighting[4].

dwatta BachThe plant is used in Bach flower remedies - the keywords for prescribing it are 'Black depression', 'Melancholia' and 'Gloom'[209].

nrakta Europe, including Britain, south and east from Norway to N. Africa, Siberia and S.W. Asia. ksacta Cultivated ground, usually on heavy calcareous soils[13, 17]. A serious weed of agriculture, especially in spring sown crops[1, 17].

propta Seed - germinates in spring and autumn in the wild. It should not really need much encouragement.

nwatta Usually found on heavy alkaline soils in the wild[17]. Succeeds on most soils. Dislikes shade. The plant harbours an eelworm that attacks other crops[13]. It is therefore best not to grow it in a garden setting.

6.2.297 Ophrys insectifera

Fly Orchid

5 tlin 9 cyuc 2 kcaak 0 tcan 2 dwat 0.5 m hkuc

drutta Fuchsia magellanica is a deciduous Shrub growing to 3.6 m (11ft) by 2 m (6ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw. A juicy berry[K], it is not very palatable[105, 177].

tcanta Dye Hedge HedgeA black dye is obtained from the wood[46, 61]. Very resistant of maritime exposure and tolerant of trimming it makes a good informal hedge in mild maritime areas[29, 75, 166]. The variety 'Riccartonii' is commonly used[200]. The cultivar 'Prostrata' forms a carpet of growth and can be used as a ground cover when planted about 60cm apart each way[208].

dwatta Diuretic FebrifugeDiuretic, febrifuge[46].

nrakta S. America. - Peru and south to Tierra Del Fuego. Naturalized in S.W. England. ksacta Forest clearings and margins, especially in mixed evergreen/deciduous woods[69].

propta Seed - best sown as soon as it is ripe[200] though it can also be sown in the spring[1]. Surface sow the seed in pots in a warm greenhouse and do not allow the compost to dry out[200]. Germination should take place in less than 6 weeks. Prick out the seedlings into individual pots when they are large enough to handle, and grow them on in the greenhouse for at least their first winter. Plant out in late spring or early summer, after the last expected frosts. Inter-nodal cuttings of greenwood, 5 - 8cm long, May/June in a frame. Quick and easy, a high percentage take[78, K]. Overwinter in the greenhouse for the first year and plant out after the last expected frosts. Inter-nodal cuttings of half-ripe wood, July/August in a frame. Very quick and easy, treat as greenwood cuttings above[K]. Cuttings usually succeed at any time during the growing season[K].

nwatta Landscape Uses:Border, Container, Ground cover, Specimen. Succeeds in any fertile well-drained circum-neutral soil, preferring one that is rich in humus[1, 200]. Grows well in heavy clay soils. Prefers cool moist conditions and some shade[1, 15]. Succeeds in a good loam if leafmold and sand are added[1]. This species is very resistant to maritime exposure, it can be grown right on the coast[75, 166]. The top growth is hardy to about -10°c[184], this can be cut right back to the ground in severe winters but the plants usually recover well, growing away quickly in the late spring and flowering by late summer[200]. The young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. The sub-species *F. magellanica myrtifolia* often bears a very large crop of fruit[K]. The cultivar 'Riccartonii' can be hardy fairly well north in Britain. A lovely specimen 3 metres tall was seen growing in dappled shade of trees in the Monastery Gardens in York[K]. A very ornamental plant, it is a parent of most of the hardy ornamental fuchsia varieties[1]. Plants seem to be immune to the predations of rabbits[233]. Plants are pollinated by humming birds in the wild, they are good bee plants in Britain[108]. Special Features: Extended bloom season in Zones 9A and above, Blooms are very showy.

6.2.247 Rosa pisocarpa

Cluster Rose, Ahart's cluster rose

5 tlin 9 cyuc 2 kcaak 0 tcan 2 dwat 2.5 m hkuc hmimhtut cyutli tcup hwicli hrasjutnyikfrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Rosa pisocarpa is a deciduous Shrub growing to 2.5 m (8ft 2in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to July, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no

shade. It prefers moist soil.

pcista There is a layer of hairs around the seeds just beneath the flesh of the fruit. These hairs can cause irritation to the mouth and digestive tract if ingested.

kcakta Edible Parts: Fruit Seed StemEdible Uses: TeaFruit - raw or cooked[118, 183]. It is used to make jams and jellies, it is also used to make a pleasant tasting fruity-flavoured tea[177, 183]. The fruit is about 13mm in diameter[200], but there is only a thin layer of flesh surrounding the many seeds[K]. Some care has to be taken when eating this fruit, see the notes above on known hazards. The seed is a good source of vitamin E, it can be ground into a powder and mixed with flour or added to other foods as a supplement[102, 183]. Be sure to remove the seed hairs[102]. The shoots can be used to make a tea-like beverage[257]. Young tender shoots - peeled and eaten in the spring[257].

dwatta Astringent Cancer Foot care VD Women's complaintsA decoction of the roots has been used in the treatment of sore throats and syphilis[257]. An infusion of the bark has been taken by a mother just after childbirth[257]. A decoction of the branches, combined with chokecherry (*Prunus virginiana*) and red willow (*Salix bonplandiana*), has been used in the treatment of various women's complaints, diarrhoea and vomiting[257]. The leaves have been placed in the shoes as a protection from athletes foot[257]. The fruit of many members of this genus is a very rich source of vitamins and minerals, especially in vitamins A, C and E, flavanoids and other bio-active compounds. It is also a fairly good source of essential fatty acids, which is fairly unusual for a fruit. It is being investigated as a food that is capable of reducing the incidence of cancer and also as a means of halting or reversing the growth of cancers[214].

nrakta Western N. America - British Columbia to California. ksacta Shaded slopes below 1500 metres in California.

propta Seed. Rose seed often takes two years to germinate. This is because it may need a warm spell of weather after a cold spell in order to mature the embryo and reduce the seedcoat[80]. One possible way to reduce this time is to scarify the seed and then place it for 2 - 3 weeks in damp peat at a temperature of 27 - 32°c (by which time the seed should have imbibed). It is then kept at 3°c for the next 4 months by which time it should be starting to germinate[80]. Alternatively, it is possible that seed harvested 'green' (when it is fully developed but before it has dried on the plant) and sown immediately will germinate in the late winter. This method has not as yet(1988) been fully tested[80]. Seed sown as soon as it is ripe in a cold frame sometimes germinates in spring though it may take 18 months. Stored seed can be sown as early in the year as possible and stratified for 6 weeks at 5°c[200]. It may take 2 years to germinate[200]. Prick out the seedlings into individual pots when they are large enough to handle. Plant out in the summer if the plants are more than 25cm tall, otherwise grow on in a cold frame for the winter and plant out in late spring. Cuttings of half-ripe wood with a heel, July in a shaded frame. Overwinter the plants in the frame and plant out in late spring[78]. High percentage[78]. Cuttings of mature wood of the current seasons growth. Select pencil thick shoots in early autumn that are about 20 - 25cm long and plant them in a sheltered position outdoors or in a cold frame[78, 200]. The cuttings can take 12 months to establish but a high percentage of them normally succeed[78]. Division of suckers in the dormant season. Plant them out direct into their permanent positions. Layering. Takes 12 months[11].

nwatta Succeeds in most soils[11], preferring a circumneutral soil and a sunny position[200]. Grows well in heavy clay soils. Dislikes water-logged soils[200]. Grows well with alliums, parsley, mignonette and lupins[18, 20]. Garlic planted nearby can help protect the plant from disease and insect predation[18, 20]. Grows badly with boxwood[18]. Hybridizes freely with other members of this genus[80]. Plants in this genus are notably susceptible to honey fungus[200].

6.2.248 Rubus thibetanus

5 tlin 9 cyuc 2 kcaak 0 tcan 0 dwat 2.5 m hkuc hmimhtut cyutli tcup hwicli hrasjutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Rubus thibetanus is a deciduous Shrub growing to 2.5 m (8ft) by 3 m (9ft) at a medium rate. See above

for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit**Edible Uses:** Fruit - raw or cooked[K]. The purplish black or dark red fruit is about 16mm in diameter[20].

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

nrakta E. Asia - W. China. **ksacta** Thickets, forest margins, roadsides, slopes, ravines and dry places at elevations of 900 - 2100 metres[266].

propta Seed - requires stratification, is best sown in early autumn in a cold frame. Sow stored seed as early as possible in the year in a cold frame and stratify for a month at 3°C if sowing later than February. Prick out the seedlings when they are large enough to handle and grow on in a cold frame. Plant them out into their permanent positions in late spring of the following year. Tip layering in July. Plant out in autumn. Division in early spring.

nwatta Easily grown in a good well-drained loamy soil in sun or semi-shade[1, 11, 200]. Spreads by means of suckers[182]. Plants in this genus are notably susceptible to honey fungus[200].

6.2.249 Quercus michauxii

Swamp Chestnut Oak

5 tin 9 cyuc 2 kcaak 3 tcan 2 dwat m hkuc hmimhtut cyutli tcuphja7n hwicli jlutnyik hpa7tli flatprikliwis hpa7tmwatli hjonli

drutta *Quercus michauxii* is a deciduous Tree growing to 30 m (98ft 5in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil. The plant can tolerate strong winds but not maritime exposure.

kcakta Edible Parts: Seed**Edible Uses:** CoffeeSeed - cooked[2, 46, 161]. The seed is large, up to 35mm long and 30mm wide[82], but contains bitter tannins[183]. Other reports say that the acorns are sweet and edible[82, 235]. The seed can be roasted then dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread[183]. The bitter tannins can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute.

tcanta Repellent Tannin Wood**Agroforestry Uses:** The tree has been used in restoring degraded bottomland hardwood forests of the Southeastern USA[1050]. Other Uses: The leaves of most species in this genus are more or less rich in tannins. A mulch of the partially decayed leaves can be placed around vulnerable plants in order to repel slugs, snails, grubs etc, and these will in time break down to add humus and nutrients to the soil. Fresh leaves should be used with caution, however, since as these decay they utilize some of the nitrogen in the soil and thus can inhibit plant growth[20, K]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff and is also used by many cultures to make ink[4, 331]. The bark of oak trees is also usually rich in tannins and can be used

as a dyestuff and for waterproofing rope[331, K]. The wood is heavy, hard, very strong, tough, dense, durable, easy to split[82, 171, 235]. It weighs 50lb per cubic foot[235]. It machines well, but is subject to checking and warping if not dried properly. It is largely used for flooring, furniture, boxes, barrels, boat making and veneer[229, 1050]. The wood is a favoured fuel - burning well and giving off a lot of heat[331, 229].

dwatta Astringent DysenteryAny galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta South-eastern N. America - Delaware to Indiana, Missouri, Florida and Texas. **ksacta** Inundated bottoms, stream borders and swamps[43].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Landscape Uses:Firewood, Pest tolerant, Aggressive surface roots possible, Specimen, Street tree. Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. Prefers warmer summers than are usually experienced in Britain, trees often grow poorly in this country and fail to properly ripen their wood resulting in frost damage overwinter[200]. Closely related to *Q. prinus*[11]. This species is often confused with *Q. prinus*, *Q. prinoides* and *Q. muehlenbergii*[200]. The tree flowers on new growth produced in spring, the seed ripening in its first year[200, 229]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200]. Special Features:Attracts birds, North American native, Wetlands plant, Inconspicuous flowers or blooms. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2].

6.2.250 Ribes inerme

Whitestem Gooseberry, Klamath gooseberry

5 tin 9 cyuc 2 kcaak 0 tcan 0 dwat 2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Ribes inerme* is a deciduous Shrub growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 6. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit**Edible Uses:** Fruit - raw or cooked[101, 105, 161, 257]. A gooseberry[161]. The fruit is about 8mm in diameter[200].

nrakta Western N. America - British Columbia to Montana, south to California. **ksacta** Moist, often shaded places, 1000 - 3200 metres in California.

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. Stored seed requires 4 - 6 months cold stratification at 0°C and should be sown as early in the year as possible[113, 164]. Under normal storage conditions the seed can remain viable for 17 years or more. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter, planting them out in late spring of the following year. Cuttings of half-ripe wood, 10 - 15cm with a heel, July/August in a frame[78, 113]. Cuttings of mature wood of the current year's growth, preferably with a heel of the previous year's growth, November to February in a cold frame or sheltered bed outdoors[78, 200].

nwatta Landscape Uses: Border, Foundation, Ground cover, Massing, Specimen. Easily grown in a damp to wet soil in full sun or shade[162, 200]. Members of this genus are rarely if ever troubled by browsing deer[233]. Special Features:Attractive foliage, Wetlands plant, Inconspicuous flowers or blooms.

6.2.292 Phalaris canariensis

Canary Grass, Annual canarygrass

5 tin 9 cyuc 2 kcaak 0 tcan 0 dwat 1 m hkuc htut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Phalaris canariensis* is a ANNUAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf from May to October, in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist or wet soil.

kcakta Edible Parts: Leaves Seed**Edible Uses:** Seed - cooked. Widely grown as a food for caged birds, the seed is rather small but can also be used as a cereal for making porridge etc[2]. It can be ground into a flour and used for making cakes, puddings etc[2, 22, 46, 61, 74, 115]. Leaves - cooked[106]. The young plant is used[177].

nrakta Europe - Mediterranean. **ksacta** Dry open habitats[50]. A casual of waste places in Britain[17].

propta Seed - sow spring in situ[162].

nwatta An easily grown plant, succeeding in an ordinary garden soil[1]. It is tolerant of most conditions, dry or wet[200]. Cultivated for its seed which is commonly used in wild bird food mixes[1].

6.2.293 Mentha suaveolens

Round-leaved Mint, Apple mint, Pineapple Mint

5 tin 10 cyuc 2 kcaak 2 tcan 2 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Mentha suaveolens* is a PERENNIAL growing to 1 m (3ft 3in) by 0.8 m (2ft 7in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

kcakta Edible Parts: Leaves**Edible Uses:** Condiment TeaLeaves - raw or cooked as a potherb[50]. Used as a flavouring in salads or cooked foods[183]. The leaves have a similar flavour to spearmint, and are considered to be superior in flavour to that species but are also hairy, which makes them less suitable for garnishing[238]. A herb tea is made from the leaves[183].

tcanta Essential Repellent StrewingAn essential oil is obtained from the whole plant. Rats and mice intensely dislike the smell of mint. The plant was therefore used in homes as a strewing herb and has also been spread in granaries to keep the rodents off the grain[244].

dwatta Antiseptic Carminative FebrifugeRound leafed mint, like many other members of this genus, is often used as a domestic herbal remedy, being valued especially for its antiseptic properties and its beneficial effect on the digestion. Like other members of the genus, it is best not used by pregnant women because large doses can cause an abortion. A tea made from the leaves of most mint species has traditionally been used in the treatment of fevers, headaches, digestive disorders and various minor ailments[222]. The leaves are harvested as the plant comes into flower and can be dried for later use[238]. The essential oil in the leaves is antiseptic, though it is toxic in large doses[222].

nrakta S. and W. Europe, north to the Netherlands and east into W. Asia. **ksacta** Damp ground that often dries out in summer, from sea level to 400 metres in Turkey[93].

propta Seed - sow spring in a cold frame. Germination is usually fairly quick. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. *Mentha* species are very prone to hybridisation and so the seed cannot be relied on to breed true. Even without hybridisation, seedlings will not be uniform and so the content of medicinal oils etc will vary. When growing plants with a particular aroma it is best to propagate them by division[K]. Division can be easily carried out at almost any time of the year, though it is probably best done in the spring or autumn to allow the plant to establish more quickly. Virtually any part of the root is capable of growing into a new plant. Larger divisions can be planted out direct into their permanent positions. However, for maximum increase it is possible to divide the roots up into sections no more than 3cm long and pot these up in light shade in a cold frame. They will quickly become established and can be planted out in the summer.

nwatta Landscape Uses:Border, Ground cover, Specimen. A very easily grown plant, it succeeds in most soils and situations so long as the soil is not too dry[1, 200]. Grows well in heavy clay soils. A sunny position is best for production of essential oils, but plants also succeed in partial shade. Often cultivated as a pot herb[50]. There are some named varieties[200]. The flowers have a sickly sweet smell[50]. A very invasive plant, spreading freely at the roots[200]. Unless you have the space to let it roam, it needs to be restrained by some means such as planting it in a container that is buried in the soil[K]. It is said to be a good companion for cabbages and tomatoes, its aromatic leaves repelling insect pests, though its aggressive root system also needs to be taken into account here. The whole plant has a mint-like aroma. The flowers are very attractive to bees and butterflies. Members of this genus are rarely if ever troubled by browsing deer[233]. Hybridizes freely with other members of this genus. Special Features: Attractive foliage, Edible, Fragrant foliage, Not North American native, Invasive, Naturalizing, Suitable for cut flowers, Suitable for dried flowers. The plant is heat tolerant in zones 9 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2].

6.2.294 Calendula arvensis

Field Marigold

5 tin 9 cyuc 2 kcaak 0 tcan 3 dwat 0.3 m hkuc htut cyutli tcup hwicli hyishrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli hjonli

drutta *Calendula arvensis* is a ANNUAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from June to November, and the seeds ripen from August to November. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Flowers Leaves**Edible Uses:** Young shoots and leaves - raw or cooked[105, 177, 183, 217]. The leaves are very rich in vitamins and minerals, they are similar

to handle and grow them on for their first year in a greenhouse. Plant them out in early summer. Division of the tubers in spring or autumn[200]. Be careful not to damage the tubers[200]. If dividing in the autumn, it is best to store the tubers in a cool but frost-free place over the winter, planting them out in the spring. Spring divisions can be planted out straight away into their permanent positions.

nwatta Requires a well-drained soil in full sun with shelter from cold winds[200]. Hardy to at least -15°C[200], if the top growth is killed back by the cold the plants will usually regrow. Another report says that it is hardy to about -25°C but is totally deciduous in the winter[187].

6.2.289 Rheum ribes

5 tlin 9 cyuc 2 kcaak 0 tcan 0 dwat 1.5 m hkuc
hmmihtut cyutli kyuctcup hwicli jltunykfrip hpa7tli flatprik-
wis hpa7tmwatli xre7t hjonli

drutta Rheum ribes is a PERENNIAL growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to July, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Although no specific mention has been seen for this species, the leaves of some if not all members of this genus contain significant quantities of oxalic acid and should not be eaten in any quantity. Oxalic acid can lock up certain minerals in the body, especially calcium, leading to nutritional deficiency. The content of oxalic acid will be reduced if the plant is cooked. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Edible Parts: StemEdible Uses: Leaf stem - cooked[2, 93, 105]. Eaten raw by the local people[187].

nrakta W. Asia - Turkey to Iran. ksacta Dry gorges among rocks, 2300 - 2700 metres[93, 187].

propta Seed - best sown in autumn in a shaded cold frame[200]. The seed can also be sown in spring in a cold frame. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse or cold frame for their first winter, planting them out in the spring. Division in early spring or autumn[1, 111]. Divide up the rootstock with a sharp spade or knife, making sure that there is at least one growth bud on each division. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Prefers a deep, fertile, moderately heavy, humus rich, moisture retentive, well-drained soil in sun or semi-shade[200]. Grows well in heavy clay soils. Best grown in a dry position, where it can be very long-lived[187]. Hardy to about -20°C according to one report[200] whilst another says that plants are somewhat tender in Britain[1]. Plants in this genus seem to be immune to the predations of rabbits[233]. Hybridizes freely with other members of this genus[200].

6.2.290 Gastrodia elata

Tien Ma

5 tlin 9 cyuc 2 kcaak 0 tcan 3 dwat 1 m hkuc
pcimhmm cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikwis
hpa7tmwatli xre7t hjonli

drutta Gastrodia elata is a PERENNIAL growing to 1 m (3ft 3in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Root - raw or roasted[61, 178]. Large[178].

dwatta Analgesic Antispasmodic Aphrodisiac Carminative Cholagogue Epilepsy Sedative TonicThis species has been used in Chinese herbal medicine for over 1,500 years[238]. The root contains a number of phenolic compounds with medicinal actions[279]. It is a sweet, acrid, herb that is analgesic, anticonvulsive, antispasmodic, carminative, cholagogue, sedative and tonic[147, 174, 176, 238, 279]. It is used internally in the treatment of convulsive illnesses (such as epilepsy and tetanus), rheumatoid arthritis, vertigo and numbness associated with liver disharmony[238]. The root is harvested in the autumn and dried for later use[238]. The stem is aphrodisiac and tonic[218].

nrakta E. Asia - China, Japan, Korea. ksacta Woods in the mountains of N. Japan[58].

propta Seed - surface sow, preferably as soon as it is ripe, into the plants natural habitat near existing colonies, or onto a bed of Quercus wood inoculated with the fungus *Armillaria mellea* (introduce this fungus into your land with extreme caution since it kills trees and there is no known preventative[K]). The seed of this species is extremely simple, it has a minute embryo surrounded by a single layer of protective cells. It contains very little food reserves and depends upon a symbiotic relationship with a species of soil-dwelling fungus. The fungal hyphae invade the seed and enter the cells of the embryo. The orchid soon begins to digest the fungal tissue and this acts as a food supply for the plant. Division in autumn. The plant is very intolerant of root disturbance, any moving or dividing should be attempted in the autumn, keep a large ball of soil around the plant[1].

nwatta A saprophytic herb, it is without green parts and is entirely dependant upon a fungus for its nutriment[238]. This makes it very difficult to cultivate outside its native range. As well as its fungal host, it also requires a damp humus-rich soil in a sheltered woodland position[238]. The plants are very hardy, tolerating temperatures down to at least -15°C[238]. This plant is becoming increasingly rare in the wild, due to over-collection as a medicinal plant[238]. Methods of cultivating it have now been devised in China[238]. Orchids are, in general, shallow-rooting plants of well-drained low-fertility soils. Their symbiotic relationship with a fungus in the soil allows them to obtain sufficient nutrients and be able to compete successfully with other plants. They are very sensitive to the addition of fertilizers or fungicides since these can harm the symbiotic fungus and thus kill the orchid[230].

6.2.291 Carex elata

Tufted Sedge, Golden Variegated Sedge, Tufted Sedge

5 tlin 9 cyuc 2 kcaak 0 tcan 0 dwat 1.2 m hkuc
hmmihtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flat-
prikwlisslip hpa7tmwatli hjonli

drutta Carex elata is an evergreen Perennial growing to 1.2 m (4ft) by 1.5 m (5ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from May to June, and the seeds ripen from July to August. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: Root SeedEdible Uses: Root - cooked[172]. Seed[172]. No further details are given, but the seed is small and fiddly to use[K].

tcanta BeddingThe leaves are used for bedding[61]. Plants form impenetrably dense clumps and when planted close together in drifts make an excellent ground cover[200]. nrakta Most of Europe, including Britain, south to Algeria and east to the Caucasus. ksacta By fen ditches and in wet places by rivers and lakes in base-rich soils[17, 50].

propta Seed - sow in situ in the spring in a moist soil in light shade. If seed is in short supply it can be sown in a cold frame and be planted out in the summer. The seed usually germinates in 2 - 6 weeks at 15°C[138]. Division in spring[200]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the summer or following spring.

nwatta Easily grown in a moisture retentive but well-drained loamy soil of at least moderate quality[11, 200]. Prefers a sunny position[11]. Hardy to about -20°C[200]. Some botanists include this species as part of *R. divaricatum* as *R. divaricatum inerm.* (Rydb.)McMinn.[71]. The stems are occasionally thorned or smooth[200]. Plants can harbour a stage of 'white pine blister rust', so they should not be grown in the vicinity of pine trees[155]. Plants in this genus are notably susceptible to honey fungus[200].

6.2.251 Sorbus sambucifolia

Siberian mountain ash

5 tlin 9 cyuc 2 kcaak 0 tcan 0 dwat m hkuc
hmmihtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikwis
hpa7tmwatli xre7t hjonli

drutta Sorbus sambucifolia is a deciduous Shrub. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

pcista The seeds probably contain hydrogen cyanide. This is the ingredient that gives almonds their characteristic flavour. Unless the seed is very bitter it should be perfectly safe in reasonable quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 161]. Sweet tasting[11].

nrakta E. Asia - Japan. ksacta High mountains, C. and N. Japan[58].

propta Seed - best sown as soon as it is ripe in a cold frame[78, 80]. If you have sufficient seed it can be sown in an outdoor seedbed[78, 80]. Stored seed germinates better if given 2 weeks warm then 14 - 16 weeks cold stratification[98], so sow it as early in the year as possible. Prick out the seedlings into individual pots when they are large enough to handle. Seedlings are very slow to put on top-growth for their first year or two[11], but they are busy building up a good root system. It is best to keep them in pots in a cold frame for their first winter and then plant them out into their permanent positions in late spring.

nwatta Succeeds in most reasonably good soils in an open sunny position[11]. Tolerates light shade[188], though it fruits better in a sunny position[K]. Plants are susceptible to fireblight[188]. There is considerable confusion over the naming of this species, trees grown under this name have included *S. decora.*, *S. matsumurana.*, *S. scopulina.* and *S. sitchensis*[1].

6.2.252 Scorzonera mollis

5 tlin 9 cyuc 2 kcaak 0 tcan 0 dwat m hkuc
htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatprikwis
hpa7tmwatli xre7t hjonli

drutta Scorzonera mollis is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Root - cooked[105, 177]. Leaves - cooked[105, 177]. Flowers - raw[61, 105, 177]. The flowers have a scent of chocolate[46].

nrakta E. Europe to W. Asia. ksacta Rocky places in S. Europe[45]. Meadows and pine forests, 30 - 2650 metres in Turkey[93].

propta Seed - sow spring in the greenhouse. Prick out the seedlings as soon as they are large enough to handle into relatively deep pots to accommodate the tap root. If growth

is good, plant out in early summer, other wise grow them on in the greenhouse for their first winter and plant them out in late spring of the following year. Division in autumn or as growth commences in spring. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Succeeds in any soil in sun or light shade[200].

6.2.253 Ribes sanguineum

Flowering Currant, Blood currant

5 tlin 9 cyuc 2 kcaak 0 tcan 0 dwat 2.5 m hkuc
hmmihtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprik-
wis hpa7tmwatli xre7t hjonli

drutta Ribes sanguineum is a deciduous Shrub growing to 2.5 m (8ft) by 2.5 m (8ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from April to May, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[101, 105, 118, 257]. It does not have a wonderful flavour, but is tolerable raw[K]. It can be harvested when still firm in August and when stored carefully will keep until November, by which time the flavour has improved slightly[K]. The fruit is about 10mm in diameter[200].

tcanta Hedge HedgeTolerates maritime exposure and can be grown as an informal hedge[29, 49]. It provides reasonable shelter when in leaf but is rather bare and gives little protection in winter[K]. Fruit loved by birds. A good ground-cover shrub for dry shade when planted with shorter ground-covers.

nrakta Western N. America. Occasionally naturalized in Britain. ksacta Open to wooded, moist to rather dry valleys and foothills[60].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. Stored seed requires 3 months cold stratification at between 0 and 5°C and should be sown as early in the year as possible[113, 164]. Under normal storage conditions the seed can remain viable for 17 years or more. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter, planting them out in late spring of the following year. Cuttings of half-ripe wood, 10 - 15cm with a heel, July/August in a frame[78, 113]. Cuttings of mature wood of the current year's growth, preferably with a heel of the previous year's growth, November to February in a cold frame or sheltered bed outdoors[78, 200].

nwatta Easily grown in a moisture retentive but well-drained loamy soil of at least moderate quality[11, 200]. Grows well in heavy clay soils. Succeeds in full sun, it is also quite tolerant of shade though it does not fruit so well in such a position[11]. Tolerates maritime exposure[49]. Hardy to about -25°C[200]. A very ornamental plant[1], there are a number of named varieties[182]. A plant labelled 'Carneum Grandiflorum' was seen at Kew with a very good crop of unripe fruit in July 1994[K]. A disease-resistant plant, the species is being used in blackcurrant breeding programmes[119]. Plants can harbour a stage of white pine blister rust, so should not be grown in the vicinity of pine trees[155]. Plants in this genus are notably susceptible to honey fungus[200]. Heat zone: 8-6.

6.2.254 Gossypium hirsutum

Upland Cotton

5 tlin 10 cyuc 2 kcaak 4 tcan 1 dwat 2 m hkuc
htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikwis
hpa7tmwatli hjonli

drutta Gossypium hirsutum is a SHRUB growing to 2 m (6ft) by 2 m (6ft) at a fast rate. See above for USDA hardiness.

It is hardy to UK zone 5. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. The plant is not wind tolerant.

pista Some forms of this plant contain the toxin gossypol - glandless cultivars are free of this toxin[301].

kcakta Edible Parts: Oil SeedEdible Uses: OilSeed - cooked. The seeds contain up to 40% protein, they have a nutty flavour when roasted and can be eaten as a snack[301]. They are also boiled and used like rice in casseroles and soups[301]. Ground into a powder, they can be added to flour when making bread, cakes etc[301]. They can also be made into a spread similar to peanut butter[301]. Some forms of this plant produce seeds containing the toxin gossypol, which needs to be removed before the seed is eaten[301]. The seeds of glandless cultivars do not contain this toxin[301]. An oil obtained from the seed is used for salads, in cooking and to make margarine etc[301 , 418]. Carbon Farming - Staple Crop: oil.

tcanta OilAgroforestry Uses: Low-grade seed cake, after the oil has been expressed, is used as manure[418]. Other Uses A good quality fibre is obtained from the seed floss[46]. Cotton fibres have a wide range of used including making clothes; rubber-tyre fabrics; stuffing material for pillows, cushions etc; surgical dressings; making twine and ropes; carpets etc[46]. An oil is obtained from the seed. Low-grades of the oil are used in the manufacture of soap, lubricants, sulphonated oils and protective coatings[418]. The seed hulls and the dry stalks are used as fuel[418]. Carbon Farming. Industrial Crop: fiber. Other Systems: strip intercrop.

dwatta The boiled leaves are applied to skin rashes on children[348].

nrakta Central America, north to southern N. America and the Caribbean. ksacta Not known

propta Seed. In zones 8-10 it can be sown directly after the last frost. In zones 5-7, treat like tomatoes. Seed germinates in 7-21 days at 70 F. Plant 18-30 in. apart in rows 5 ft. apart. Plants start flowering in mid-summer.

nwatta Industrial Crop: Fiber Management: Coppice Management: Standard Other Systems: Strip intercrop Regional Crop Staple Crop: OilSea Island cotton can be grown in the dry to moist tropics and subtropics, where it is found at elevations up to 1,250 metres. For commercial production it requires a climate that has a long, hot growing season with abundant moisture, followed by a drier period for harvesting the seed floss[200]. Low temperature increases the production of vegetative branches and extends the cropping period, while high temperature increases the number of fruiting branches and reduces the cropping period. It grows best in areas where annual daytime temperatures are within the range 22 - 36°C, but can tolerate 15 - 42°C[418]. It prefers a mean annual rainfall in the range 750 - 1,200mm, but tolerates 450 - 1,500mm[418]. Prefers a very sunny position in a light, fertile soil[200]. Plants can tolerate a range of well-drained soils, including moderate levels of salt[418]. Prefers a pH in the range 6 - 7.5, tolerating 5 - 9.5[418]. Requires a position sheltered from strong winds[418]. The plant is usually cultivated as an annual, taking 150 - 220 days to mature a crop[418]. Seed-cotton yields vary between 0.8 - 3 tonnes/ha, or 0.2 - 1.1 tonnes/ha of fibre[418]. Carbon Farming - Cultivation: regional crop. Management: standard, coppice. Perennial cotton has longer fibres and is considered superior to annual cottons. Perennial cottons are suited to arid and humid conditions while annual cottons were bred for colder climates and for mechanical harvesting. Perennial cottons are cultivated in the tropics on a smaller scale and include *Gossypium arboreum burmanicum*, *Gossypium arboreum indicum*, *Gossypium arboreum soudanense*, *Gossypium barbadense brazilense*, *Gossypium barbadense darwinii*, *Gossypium herbageum acerifolium*, *Gossypium herbageum africanum*, *Gossypium hirsutum marie-galante*, *Gossypium hirsutum punctatum*, *Gossypium hirsutum taitense*. Currently perennial cottons are harvested by hand. Researching perennial cottons varieties and production methods would help develop them as good carbon farming plants and help to alleviate the terrible problems caused by annual cottons.

6.2.255 *Lilium pardalinum*

Panther Lily, Leopard lily, Pitkin Marsh lily, Vollmer's lilyShasta lily, Wiggins' lily

5 tlin 9 cyuc 2 kcaak 2 tcan 0 dwat 2 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasljutnyik hpa7tli flat-prikliwis hpa7tmwatli xre7t hjonli

drutta *Lilium pardalinum* is a BULB growing to 2 m (6ft) by 0.3 m (1ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in July, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, butterflies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil. The plant can tolerate strong winds but not maritime exposure.

kcakta Edible Parts: RootEdible Uses: Bulb - cooked[143, 257]. Rich in starch, it can be used as a vegetable in similar ways to potatoes (*Solanum tuberosum*).

tcanta Landscape Uses: Border, Container, Massing, Seashore, Specimen. Ornamental. Hardy bulb. US native to moist meadows and streambeds.

nrakta South-western N. America - California to Oregon. ksacta Stream banks and springy places to 2000 metres, forming large colonies near the coastal range[47, 71].

propta Seed - autumnal hypogaeal germination. Best sown as soon as ripe in a cold frame, it should germinate in spring[163]. Stored seed will require a warm/cold/warm cycle of stratification, each period being about 2 months long[163]. Grow on in cool shady conditions. Great care should be taken in pricking out the young seedlings, many people leave them in the seed pot until they die down at the end of their second years growth. This necessitates sowing the seed thinly and using a reasonably fertile sowing medium. The plants will also require regular feeding when in growth. Divide the young bulbs when they are dormant, putting 2 - 3 in each pot, and grow them on for at least another year before planting them out into their permanent positions when the plants are dormant[K]. Division in autumn once the leaves have died down. Replant immediately[200]. Bulb scales can be removed from the bulbs in early autumn. If they are kept in a warm dark place in a bag of moist peat, they will produce bulblets. These bulblets can be potted up and grown on in the greenhouse until they are large enough to plant out. Bulbils - gather in late summer when they start to fall off the stems and pot up immediately. Grow on in a greenhouse until large enough to go outside[163].

nwatta Succeeds in almost any soil that is moist but not water-logged[47, 143]. Prefers a wet soil on a slope or a well-drained soil with a high water table[90]. Tolerates lime[47, 90, 163]. Succeeds in full sun but rapidly deteriorates if grown in deep shade[143]. Fairly wind resistant but is best grown in a sheltered position[47, 143]. Very ornamental and easily grown[1], the plant is rhizomatous, forming clumps[47]. The plant increases rapidly by division, each bulb producing 5 new bulbs per year[143]. Early to mid autumn is the best time to plant out the bulbs in cool temperate areas, in warmer areas they can be planted out as late as late autumn[200]. A very variable plant, it is divided into a number of sub-species[270]. The plant should be protected against rabbits and slugs in early spring. If the shoot tip is eaten out the bulb will not grow in that year and will lose vigour[200]. Special Features: North American native, Naturalizing, Attracts butterflies, Suitable for cut flowers, Fragrant flowers. Heat Zone: 8-5.

6.2.256 *Plantago media*

Hoary Plantain

5 tlin 9 cyuc 2 kcaak 2 tcan 2 dwat m hkuc htut cyutli kyuctup hwicli hrasljutnyik hpa7tli flatprikli-wisslip hpa7tmwatli fyfjre7t hjonli

drutta *Plantago media* is a PERENNIAL growing to 0.1 m (0ft 4in) by 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from May to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind, flies, beetles, bees. The plant is self-fertile. It is noted for attracting wildlife. Suitable

is possible that seed harvested 'green' (when it is fully developed but before it has dried on the plant) and sown immediately will germinate in the late winter. This method has not as yet(1988) been fully tested[80]. Seed sown as soon as it is ripe in a cold frame sometimes germinates in spring though it may take 18 months. Stored seed can be sown as early in the year as possible and stratified for 6 weeks at 5°C[200]. It may take 2 years to germinate[200]. Prick out the seedlings into individual pots when they are large enough to handle. Plant out in the summer if the plants are more than 25cm tall, otherwise grow on in a cold frame for the winter and plant out in late spring. Cuttings of half-ripe wood with a heel, July in a shaded frame. Overwinter the plants in the frame and plant out in late spring[78]. High percentage[78]. Cuttings of mature wood of the current seasons growth. Select pencil thick shoots in early autumn that are about 20 - 25cm long and plant them in a sheltered position outdoors or in a cold frame[78, 200]. The cuttings can take 12 months to establish but a high percentage of them normally succeed[78]. Division of suckers in the dormant season. Plant them out direct into their permanent positions. Layering. Takes 12 months[11].

nwatta Succeeds in most soils[11], preferring a circum-neutral soil and a sunny position[200]. Grows well in heavy clay soils. Dislikes water-logged soils[200]. A very ornamental plant[1], there are many named forms developed for their ornamental value[245]. The flowers are fragrant[245]. The Provence rose is often cultivated for its essential oil in southern France and Morocco[4, 61]. It is closely related to *R. damascena* and *R. gallica*[11]. Grows well with alliums, parsley, mignonette and lupins[18, 20]. Garlic planted nearby can help protect the plant from disease and insect predation[18, 20]. Grows badly with boxwood[18]. Plants produce a few suckers[200]. Hybridizes freely with other members of this genus[80]. Plants in this genus are notably susceptible to honey fungus[200].

6.2.287 *Solidago canadensis*

Canadian Goldenrod, Shorthair goldenrod, Harger's goldenrod, Rough Canada goldenrod, Common Goldenrod

5 tlin 10 cyuc 2 kcaak 0 tcan 2 dwat 1.8 m hkuc hmimhtut cyuti tcup hwicli hrasljutnyikfrip hpa7tli flatprikliwis hpa7tmwatli fyfjre7t hjonli

drutta *Solidago canadensis* is a PERENNIAL growing to 1.8 m (6ft) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from August to October, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pista Weak potential for sensitization. Irrigation therapy is contraindicated in cases of oedema due to renal or heart disease. Care needed with chronic kidney disease [301].

kcakta Edible Parts: Leaves Oil SeedEdible Uses: Oil TeaYoung leaves and flowering stems - cooked[172]. Seed[22, 46, 61, 105, 161, 183]. Used as a thickener in soups[172]. The seed is very small[K] and is only used as a survival food when all else fails[22]. A tea can be made from the flowers and/or the leaves[172, 183].

tcanta Dye OilMustard, orange and brown dyes can be obtained from the whole plant[168]. The source of 'Canadian goldenrod' oil[46]. We have no further details, but it is likely to be an essential oil.

dwatta Antiseptic Haemostatic Kidney Salve Styptic UrinaryHaemostatic, styptic[168, 172]. The root is applied as a poultice to burns[168, 172, 222]. An infusion of the dried powdered herb can be used as an antiseptic[168, 172]. The blossoms are analgesic, astringent and febrifuge[257]. They have been chewed and the juice slowly swallowed to treat sore throats[213, 222]. A tea made from the flowers is used in the treatment of diarrhoea, body pains, fevers and snakebites[222, 257]. The plant contains quercetin, a compound that is reportedly useful in the treatment of haemorrhagic nephritis[222]. This plant is said to have similar medicinal properties to *S. virgaurea*. These are:- Gold-

enrod is a safe and gentle remedy for a number of disorders. In particular, it is a valuable astringent remedy treating wounds and bleeding, whilst it is particularly useful in the treatment of urinary tract disorders, being used both for serious ailments such as nephritis and for more common problems such as cystitis[254]. The plant contains saponins that are antifungal and act specifically against the *Candida* fungus which is the cause of vaginal and oral thrush[238, 254]. It also contains rutin which is used to treat capillary fragility, and phenolic glycosides which are anti-inflammatory[238]. The leaves and flowering tops are anthelmintic, anti-inflammatory, antiseptic, aromatic, astringent, carminative, diaphoretic, mildly diuretic, febrifuge and stimulant[4, 7, 9, 21, 147, 165]. A good vulnerary herb, it has also proved of value when used internally in the treatment of urinary infections, chronic catarrh, skin diseases, influenza, whooping cough, bladder and kidney stones etc[4, 238]. Due to its mild action, goldenrod is used to treat gastro-enteritis in children[254]. It makes an excellent mouthwash in the treatment of thrush[7]. The plant is gathered in the summer and dried for later use[7]. The seed is antioedulant, astringent and carminative[218]. A homeopathic remedy is made from the plant[9]. It is used in the treatment of kidney and bladder disorders, rheumatism and arthritis[9]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve *Solidago canadensis* for infections of the urinary tract, and kidney and bladder stones (see [302] for critics of commission E).

nrakta Eastern N. America - Newfoundland to Ontario, south to Virginia. Naturalized in Britain[17]. ksacta Dry to damp thickets, roadsides, slopes and clearings, avoiding acid soils.

propta Seed - sow spring in a cold frame. Only just cover the seed and do not allow the compost to become dry. Prick out the seedlings into individual pots when they are large enough to handle, and grow them on for their first winter in pots. Plant them out into their permanent positions in spring or early summer. Division in spring or autumn. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Landscape Uses:Border, Container, Foundation, Seashore, Specimen, Woodland garden. Succeeds in any moderately fertile moisture retentive soil in sun or semi-shade[200]. Grows well in heavy clay soils. A rather greedy plant, it is apt to impoverish the soil[1]. The flowers attract butterflies and moths[30]. The plant also attracts various beneficial insects such as ladybirds, lacewings and hoverflies to the garden, these insects will help to control insect pests in the garden[201, 238]. Special Features: Attractive foliage, North American native, Naturalizing, Suitable for cut flowers, Suitable for dried flowers.

6.2.288 *Phlomis tuberosa*

Tuberous Jerusalem sage

5 tlin 9 cyuc 2 kcaak 0 tcan 0 dwat 1.5 m hkuc htut cyutli kyuctup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli hre7t hjonli

drutta *Phlomis tuberosa* is a PERENNIAL growing to 1.5 m (5ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: RootEdible Uses: Root - cooked[2, 105, 177, 183]. Rich in starch[74] but with a somewhat bitter flavour[K].

nrakta E. Europe to Siberia. ksacta Dry rocky ground amongst herbaceous vegetation[45, 50]. Wet grasslands and valleys at elevations of 1200 - 2100 metres in northern China[266].

propta Seed - sow spring in a greenhouse and only just cover the seed. The seed germinates quickly, prick out the seedlings into individual pots when they are large enough

then it can be sown in a pot in the greenhouse in the spring. Prick out the seedlings into individual pots as soon as they are large enough to handle and plant them out into their permanent positions in early summer.

nwatta An easily grown plant, it succeeds in almost any ordinary garden soil[1, 111]. Requires a well-drained soil, preferably in full sun though it tolerates light shade[200]. Prefers a slightly alkaline soil[200]. Grows very well in poor soils, succeeding in hot dry situations and tolerating drought when it is established[190]. A slow-growing plant[188]. Hardy to about -15°C[200]. A very ornamental plant[1], the flowers are very attractive to bees[200]. Plants are prone to slug and snail damage[188]. Often self-sows, sometimes to the point of nuisance, though the seedlings can easily be hoed out and can also be transplanted if they are moved whilst still small[200].

6.2.284 Osmunda japonica

Zenmai

5 tin 9 cyuc 2 kcaak 0 tcan 0 dwat 1 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasljutnyik hpa7tli frusflatprikwlis hpa7tmwatli hjonli

drutta Osmunda japonica is a FERN growing to 1 m (3ft 3in). See above for USDA hardness. It is hardy to UK zone 6. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

pcista Although we have found no reports of toxicity for this species, a number of ferns contain carcinogens so some caution is advisable[200]. Many ferns also contain thiaminase, an enzyme that robs the body of its vitamin B complex. In small quantities this enzyme will do no harm to people eating an adequate diet that is rich in vitamin B, though large quantities can cause severe health problems. The enzyme is destroyed by heat or thorough drying, so cooking the plant will remove the thiaminase[172].

kcaakta Edible Parts: Leaves RootEdible Uses: Young fronds - cooked[105, 177]. An edible starch is obtained from the rhizome[105, 177].

nrakta E. Asia - China, Japan. ksacta Moist places all over Japan[58, 200].

propta Spores - they very quickly lose their viability (within 3 days) and are best sown as soon as they are ripe on the surface of a humus-rich sterilized soil in a lightly shaded place in a greenhouse. Keep the compost moist, preferably by putting a plastic bag over the pot. Plants develop very rapidly, pot on small clumps of plantlets as soon as they are large enough to handle and keep humid until they are well established. Do not plant outside until the ferns are at least 2 years old. Cultivars usually come true to type[200]. Division of the rootstock in the dormant season. This is a very strenuous exercise due to the mass of wiry roots[200].

nwatta Likes a soil of swamp mud and loamy or fibrous peat, sand and loam[1]. Succeeds in most moist soils, preferring acid conditions[200]. Requires a constant supply of water, doing well by ponds, streams etc[1]. Plants thrive in full sun so long as there is no shortage of moisture in the soil and also in shady situations beneath shrubs etc[200]. Plants are hardy to at least -20°C, they are evergreen in warm winter areas but deciduous elsewhere[200]. Members of this genus are rarely if ever troubled by browsing deer[233]. Closely related to *O. regalis*[1].

6.2.285 Cardaria draba

Hoary Cress, Whitetop

5 tin 9 cyuc 2 kcaak 0 tcan 1 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikwlis hpa7tmwatli fyfxre7t hjonli

drutta Cardaria draba is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardness. It is hardy to UK zone 6. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils.

It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcaakta Edible Parts: LeavesEdible Uses: CondimentYoung leaves and shoots - raw in salads or cooked as a potherb[2, 61, 105, 183]. A report says that the young leaves contain the toxin hydrogen cyanide, though does not give any more details[240]. In small quantities this substance is fairly harmless, and has even been recommended as having health benefits, but caution is suggested if you eat these leaves[K]. The pungent leaves are used as a seasoning[183]. The seed is used as a condiment, it is a pepper substitute[2, 17, 61, 74, 148, 183].

dwatta Antiscorbutic CarminativeThe plant is antiscorbutic[240]. The seeds have been used as a cure for flatulence and fish poison[240]. It is assumed that this report is referring to food poisoning caused by eating suspect fish[K].

nrakta Europe - Mediterranean to W. Asia. Naturalized in Britain[17]. ksacta A weed of arable fields, it is spreading rapidly in Britain[17].

propta Seed - sow in situ in spring. There is very little need to encourage this plant, it is a rapidly spreading weed in Britain. Division in spring.

nwatta Succeeds in a sunny position in most soils.

6.2.286 Rosa centifolia

Provence Rose, Cabbage rose

5 tin 9 cyuc 2 kcaak 0 tcan 2 dwat 1.5 m hkuc hmimhtut cyutli tcup hwicli hrasljutnyikfrp hpa7tli flatprikwlis hpa7tmwatli fyfxre7t hjonli

drutta Rosa centifolia is a deciduous Shrub growing to 1.5 m (5ft). See above for USDA hardness. It is hardy to UK zone 6. It is in flower from June to July, and the seeds ripen from August to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista There is a layer of hairs around the seeds just beneath the flesh of the fruit. These hairs can cause irritation to the mouth and digestive tract if ingested.

kcaakta Edible Parts: Flowers Fruit SeedEdible Uses: TeaFruit - raw or cooked. A pulpy flesh[11]. It is best after it has been softened and sweetened by frost. There is only a thin layer of flesh surrounding the many seeds[K]. Some care has to be taken when eating this fruit, see the notes above on known hazards. The seed is a good source of vitamin E, it can be ground and mixed with flour or added to other foods as a supplement[102, 183]. Be sure to remove the seed hairs[102]. The blossoms are used for scenting tea[2, 46, 177, 183]. The petals are preserved in sugar and used as a delicacy[183]. They can also be added to fruit pies as a flavouring[183].

tcanta Essential Pot-pourriAn essential oil is obtained from the flowers, it is used in perfumery[57, 61, 171]. The dried petals are used in pot-pourri[4].

dwatta Aromatherapy Astringent Cancer LaxativeThe root is astringent[240]. The petals are laxative[240]. A syrup made from the petals is used to treat constipation in infants[240]. The fruit of many members of this genus is a very rich source of vitamins and minerals, especially in vitamins A, C and E, flavanoids and other bio-active compounds. It is also a fairly good source of essential fatty acids, which is fairly unusual for a fruit. It is being investigated as a food that is capable of reducing the incidence of cancer and also as a means of halting or reversing the growth of cancers[214]. The essential oil is used in aromatherapy. Its keyword is 'Cleansing'[210].

nrakta A garden hybrid of uncertain origin. ksacta Not known in a truly wild situation.

propta Seed. Rose seed often takes two years to germinate. This is because it may need a warm spell of weather after a cold spell in order to mature the embryo and reduce the seedcoat[80]. One possible way to reduce this time is to scarify the seed and then place it for 2 - 3 weeks in damp peat at a temperature of 27 - 32°C (by which time the seed should have imbibed). It is then kept at 3°C for the next 4 months by which time it should be starting to germinate[80]. Alternatively, it

for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

kcaakta Edible Parts: Flowers LeavesEdible Uses: Young leaves - raw or cooked[7]. The very young leaves have a fairly mild flavour but with a slight bitterness[K]. Used in salads before they become tough[7]. The inflorescence is sweet and is sucked by children[177, 183].

tcanta FungicideThe leaves are a cure for blight on fruit trees[14]. An important food plant for the caterpillars of many species of butterflies[30]. The flowers are sweetly scented[245]. Dynamic accumulator.

dwatta Astringent Demulcent Deobstruent Depurative Diuretic Expectorant Haemostatic Laxative Odontalgic Ophthalmic RefrigerantThe leaves, flowering stems and roots are somewhat astringent, deobstruent, depurative, diuretic, expectorant, haemostatic, refrigerant and vulnerary[4, 7]. They are applied externally to skin inflammations, malignant ulcers, cuts etc[4, 7]. A mouthwash made from the leaves helps to relieve toothache and a distilled water is a good eye-wash[7]. The seeds are demulcent and laxative[4, 7]. Plantain seeds contain up to 30% mucilage which swells up in the gut, acting as a bulk laxative and soothing irritated membranes[238]. Sometimes the seed husks are used without the seeds[238].

nrakta Southern Europe, including Britain, to temperate Asia. ksacta Fields, meadows and lawns[7]. A common weed of lawns and cultivated land, especially on dry or calcareous soils[1].

propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in early summer. A sowing can be made outdoors in situ in mid to late spring if you have enough seeds.

nwatta Succeeds in any moderately fertile soil in a sunny position[200]. Grows well in the spring meadow[24].

6.2.257 Juglans microcarpa

Texas Walnut, Little walnut, Stewart's little walnut

5 tin 9 cyuc 2 kcaak 0 tcan 0 dwat m hkuc htut cyutli hgactcup hwicli hrasljutnyik hpa7tli flatprikwlis hpa7tmwatli fyf hjonli

drutta Juglans microcarpa is a deciduous Tree growing to 10 m (32ft) by 10 m (32ft). See above for USDA hardness. It is hardy to UK zone 6. It is in flower from May to June, and the seeds ripen from October to December. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil and can tolerate drought.

kcaakta Edible Parts: Oil SeedEdible Uses: OilSeed - raw. The seed is sweet and oily but it is rather small and has a thick shell[2, 62, 105, 183, 227]. The seed is the smallest of this genus[82]. An edible oil is obtained from the seed, it tends to go rancid quickly.

tcanta Herbicide Oil Rootstock WoodSometimes used as a rootstock[183]. Plants produce chemicals which can inhibit the growth of other plants. These chemicals are dissolved out of the leaves when it rains and are washed down to the ground below, reducing the growth of plants under the tree[18, 20, 159]. The roots of many members of this genus produce substances that are toxic to many plant species, especially apples (Malus species), members of the Ericaceae, Potentilla spp and the white pines (certain Pinus spp.)[200]. Wood - heavy, hard, not strong. It makes a beautiful veneer and has been very over-exploited in the wild for this purpose[82]. It is also used in cabinet making, furniture etc[82, 149].

nrakta South-western N. America - Texas to Mexico. ksacta Limestone banks of streams[82], also in valleys and dry rocky ravines[229].

propta The seed is best sown as soon as it is ripe in individual deep pots in a cold frame[80]. You need to protect it from mice, birds, squirrels etc. The seed usually germinates in late winter or the spring. Plant out the seedlings into their

permanent positions in early summer and give some protection from the cold for their first winter or two. The seed can also be stored in cool moist conditions (such as the salad compartment of a fridge) over the winter and sown in early spring but it may then require a period of cold stratification before it will germinate[78, 80, 113].

nwatta Requires a deep well-drained loam and a sunny position sheltered from strong winds[1, 11]. Prefers a slightly alkaline soil[200]. This species often experiences drought in its native range[229]. Plants produce a deep taproot and they are intolerant of root disturbance[1, 11]. Seedlings should be planted out into their permanent positions as soon as possible and given some protection for their first winter or two since they are somewhat tender when young[1, 11]. Flower initiation depends upon suitable conditions in the previous summer[200]. The flowers and young growths can be destroyed by even short periods down to -2°C, but fortunately plants are usually late coming into leaf[200]. Any pruning should only be carried out in late summer to early autumn or when the plant is fully dormant otherwise wounds will bleed profusely and this will severely weaken the tree[200]. Trees have a dense canopy which tends to reduce plant growth below them. We have no specific information for this species, but the roots of several members of this genus produce substances that are toxic to many plant species, especially apples (Malus species), members of the Ericaceae, Potentilla spp and the white pines (certain Pinus spp.)[200]. The leaves of many species also secrete substances that have an inhibitory effect on plants growing underneath them. All in all this is not a very good companion plant[K]. Closely related to *J. major*, and hybridizes with that species where their ranges overlap[229].

6.2.258 Morus microphylla

Texas Mulberry

5 tin 9 cyuc 2 kcaak 0 tcan 0 dwat m hkuc hmimhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikwlis hpa7tmwatli nyanhjen hjonli

drutta Morus microphylla is a deciduous Tree growing to 6 m (19ft 8in). See above for USDA hardness. It is hardy to UK zone 6. It is in flower in May, and the seeds ripen in July. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcaakta Edible Parts: FruitEdible Uses: Fruit - raw. Small and dry[149, 161, 177]. Sweet and palatable[82, 200]. The fruits can be sweet or sour[227]. The fruit can be dried for later use[257]. It is up to 15mm in diameter[200].

tcanta WoodThe twigs have been split in half lengthways and used to make serviceable baskets[257]. Wood - heavy, hard, elastic, close grained. Used for carpentry[149], but it is too small to be commercially important[229].

nrakta South-western N. America - Texas to Arizona, south to Mexico. ksacta In canyons on dry limestone hills and igneous slopes, usually along streams at elevations of 200 - 2200 metres[270].

propta The seed germinates best if given 2 - 3 months cold stratification[80, 98]. Sow the seed as soon as it is ripe if possible, otherwise in February in a cold frame. The seed usually germinates in the first spring, though it sometimes takes another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the cold frame for their first winter. Plant them out in late spring or early summer after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame. Plant out in spring. A good percentage take, though they sometimes fail to thrive[78, 113]. Cuttings of mature wood of the current season's growth, 25 - 30cm with a heel of 2 year old wood, autumn or early spring in a cold frame or a shady bed outside[78, 113, 200]. Bury the cuttings to threequarters of their depth. Layering in autumn[200].

nwatta Prefers a warm well-drained loamy soil in a sunny position[1, 11]. Formerly cultivated for its edible fruit by the North American Indians[149]. Mulberries have brittle roots and so need to be handled with care when planting

them out[238]. Any pruning should only be carried out in the winter when the plant is fully dormant because mulberries bleed badly when cut[238]. Ideally prune only badly placed branches and dead wood[238]. Plants in this genus are notably resistant to honey fungus[200]. Dioecious, male and female plants must be grown if seed is required[227].

6.2.259 Cardamine macrophylla

5 tlin 9 cyuc 2 kcaak 0 tcan 0 dwat m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta Cardamine macrophylla is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in June, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves and young shoots - cooked[105, 177].

nrakta E. Asia - China, Himalayas, Siberia. ksacta Forests and streamside, 2100 - 3600 metres from Pakistan to S.W. China, most common in the west of its range[51].

propta Seed - sow outdoors in a seedbed in a shady position in April. Plant out in autumn or spring. Division in the spring. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the summer or following spring.

nwatta Succeeds in most soils[1]. Prefers a moist humus rich soil in shade or semi-shade[200]. Best grown in cool places but water[1]. A very ornamental plant[1], it is hardy to about -15°C[187].

6.2.260 Sambucus melanocarpa

Black Elder, Rocky Mountain elder
5 tlin 9 cyuc 2 kcaak 0 tcan 2 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Sambucus melanocarpa is a deciduous Shrub growing to 4 m (13ft 1in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to July, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

pcista Although no specific mention has been seen for this species, the leaves and stems of some, if not all, members of this genus are poisonous[9, 76]. The fruit of many species (although no records have been seen for this species) has been known to cause stomach upsets to some people. Any toxin the fruit might contain is liable to be of very low toxicity and is destroyed when the fruit is cooked[65, 76].

kcakta Edible Parts: Flowers FruitEdible Uses: Fruit - raw or cooked[105, 161]. Low in pectin, it is best mixed with crab-apples or other pectin-rich fruits if used in making jams, jellies etc[183]. The fruit is about 6mm in diameter and is borne in large clusters[200]. Some caution is advised, see the notes above on toxicity. Flowers - raw or cooked.

dwatta Astringent Dysentery Poultice Salve TBThe dried ripe berries have been eaten as a treatment for diarrhoea[257]. A decoction of the roots has been used in the treatment of diarrhoea and dysentery[257]. A poultice of the boiled, mashed roots has been used as a treatment for caked breasts, cuts and wounds[257]. A decoction of the flowers has been used in the treatment of tuberculosis, coughs and colds[257]. It has also been given to children as a spring tonic[257]. A poultice of the crushed leaves has been used to treat bruises and bleeding wounds[257].

nrakta Western N. America. ksacta Moist places in California, 1800 - 3600 metres, and northwards to Canada[71].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame, when it should germinate in early spring. Stored seed can be sown in the spring in a cold frame but will probably germinate better if it is given 2 months warm followed by 2 months cold stratification first[78, 98, 113]. Prick out the seedlings into individual pots when they are large enough to handle. If good growth is made, the young plants can be placed in their permanent positions during the early summer. Otherwise, either put them in a sheltered nursery bed, or keep them in their pots in a sheltered position and plant them out in spring of the following year. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame[78]. Cuttings of mature wood of the current season's growth, 15 - 20cm with a heel, late autumn in a frame or a sheltered outdoor bed[78].

nwatta Tolerates most soils, including chalk[200], but prefers a moist loamy soil[11, 200]. Grows well in heavy clay soils. Tolerates some shade but is best in a sunny position[1]. Tolerates atmospheric pollution and coastal situations[200]. Plants in this genus are notably resistant to honey fungus[200].

6.2.261 Oemleria cerasiformis

Oso Berry, Indian plum
5 tlin 9 cyuc 2 kcaak 0 tcan 1 dwat 2.5 m hkuc hmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli nyanhjen hjonli

drutta Oemleria cerasiformis is a deciduous Shrub growing to 2.5 m (8ft) by 4 m (13ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from March to April. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

pcista Although no specific mention has been found for this plant, it belongs to a family where the leaves, seed (and sometimes also the fruit) often contain significant amounts of hydrogen cyanide. This is the toxin that gives almonds their characteristic flavour and it should only be eaten in very small quantities. Since the fruit of this species is said to have almond-scented fruit it would be unwise to eat a large quantity of it. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[46, 61, 118, 183]. A poor flavour[106]. The fruit looks like a small plum but is very bitter with an almond flavour[11]. The fully ripe fruit loses most of its bitterness[256]. The fruit only has a thin layer of flesh[200]. The fruit can be dried and stored for winter use[257]. Some caution is advised, see the notes above on toxicity.

dwatta Laxative Poultice TBThe bark is mildly laxative[257]. A decoction has been used in the treatment of tuberculosis[257]. A poultice of the chewed burned plant, mixed with oil, has been used to treat sore parts of the body[257].

nrakta Western N. America - British Columbia to California. ksacta Rocky valleys and canyons by streams, roadsides and moist to fairly dry open woods[60].

propta The seed requires 4 months stratification at 4°C. It is probably best sown in a cold frame as soon as it is ripe in the autumn. Sow stored seed as early in the year as possible. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame. Layering in spring. Takes 6 months[78]. Suckers, taken at any time in the dormant season[188].

nwatta Succeeds in an ordinary well-drained garden soil[11, 200], but becomes chlorotic on shallow soils over chalk[200]. Prefers a well-drained moisture retentive soil in

Fragrant flowers, Attractive flowers or blooms, Seldomly re-blooms.

6.2.281 Leonurus sibiricus

Chinese Motherwort, Honeyweed
5 tlin 9 cyuc 2 kcaak 0 tcan 3 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Leonurus sibiricus is a ANNUAL/BIENNIAL growing to 1 m (3ft 3in) by 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to September, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista See the notes under medicinal uses.

kcakta Edible Parts: Leaves RootEdible Uses: Young shoots - cooked[105, 177, 183]. A sweetish flavour[179]. Root - cooked with other foods[177, 183]. This probably means that it is used as a flavouring[K].

tcanta EssentialYields an essential oil[46]. No more details are given.

dwatta Antibacterial Antispasmodic Astringent Cardiac Depurative Diaphoretic Diuretic Eczema Emmenagogue Hypnotic Nervine Oxytocic Stimulant Stomachic TonicChinese motherwort is unusual amongst Chinese herbs in that it is often prescribed for use on its own and not in a mixture with other plants[238]. The whole plant is antibacterial, antispasmodic, astringent, cardiac, depurative, diaphoretic, diuretic, emmenagogue, hypnotic, nervine, oxytocic, stomachic, tonic, uterine stimulant[4, 9, 21, 46, 165, 174, 178, 192, 279]. The seeds have a similar action to the plant, but are a less effective diuretic and depurative[238]. The plant is used in the treatment of painful and excessive menstruation, post-partum bleeding, oedema, kidney complaints, kidney stones, eczema and abscesses[238, 240]. A tincture is used in the treatment of rheumatic fever[192]. The plant stimulates uterine contractions and should not therefore be used when in the earlier stages of pregnancy[240]. The plant is harvested when in flower but before the seeds have set, and is dried for later use[238]. The plant contains about 0.05% of an alkaloid called leonurine[240]. This has a curare-like effect on the motor-endings of the nervous system, acting in small doses as a stimulant to the respiratory system but in large doses causing respiratory paralysis[240].

nrakta E. Asia - China, Japan, Korea, Siberia. ksacta Stony and steppe slopes, pine forests and occasionally as a weed of cultivated land[74]. By the sea shore and along the margins of marshes and pools[178].

propta Seed - sow late spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer.

nwatta Prefers a well-drained moist soil in sun or partial shade[238]. Prefers a poor soil[108]. Plants are hardy to at least -15°C[238]. There is some confusion over the correct name for this species, it should quite probably be called *L. japonicus*.

6.2.282 Dendranthema lavandulifolium

5 tlin 9 cyuc 2 kcaak 0 tcan 2 dwat 1.5 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Dendranthema lavandulifolium is a PERENNIAL growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta The following uses are for the closely related *D. indica*. They quite possibly also apply to this species. The flower heads are pickled in vinegar[46, 61, 177, 183]. Young leaves - cooked[105, 177, 183]. An aromatic tea is made from

the leaves[183]. Seed[183]. No more details are given but it is very small and would be rather fiddly to use.

tcanta The following uses are for the closely related *D. indicum*. They quite possibly also apply to this species. The seed contains about 16% of a semi-drying oil, but no information is given as to its uses[240]. The seed is rather small, commercial extraction is probably not viable[K].

dwatta EczemaThe flowers are hypotensive and vasodilator[176]. They have an antibacterial action, inhibiting the growth of *Staphylococcus*, *E. coli*, *streptococcus*, *C. diphtheriae*, *Bacillus dysenteriae*[176]. The flowers are used in the treatment of furuncle, scrofula, deep-rooted boils, inflammation of the throat, eyes and cervix, eczema, itchinness of the skin and hypertension[176].

nrakta E. Asia - Northern China, Japan, Korea and Manchuria. ksacta Mountain slopes, rocks, river valleys, river banks, wastelands and hilly lands at elevations of 600-2800 metres[266].

propta Seed - sow spring to early summer in a greenhouse and only just cover the seed[200]. It usually germinates in 10 - 18 days at 15°C but if it does not germinate within 4 weeks then try chilling the seed for 3 weeks in the salad compartment of a fridge[164]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Succeeds in most well-drained fertile soils in a sunny position[1, 200]. This species is closely related to *D. indicum*. When bruised, the foliage has a pungent refreshing fragrance that is somewhat lemon-like and reminiscent of chamomile[245].

6.2.283 Onopordum acanthium

Scotch Thistle, Scotch cottonthistle
5 tlin 9 cyuc 2 kcaak 0 tcan 1.5 m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta Onopordum acanthium is a BIENNIAL growing to 1.5 m (5ft) by 1 m (3ft 3in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Flowers Leaves Oil Oil StemEdible Uses: Colouring Oil OilFlower buds - cooked. A globe artichoke substitute[2, 4, 9, 115, 183], though they are much smaller and very fiddly to use[K]. Stems - cooked. Used as a vegetable, they are a cardoon (*Cynara cardunculus*) substitute[2, 4]. The stems are cooked in water like asparagus or rhubarb[12]. They are best if the rind is removed[4, 115, 183]. Leaves and young plants - cooked[9, 105]. They are harvested before the flowers develop and the prickles must be removed prior to cooking[9]. The petals are an adulterant for saffron[46, 61, 105, 183], used as a yellow food colouring and flavouring. A good quality edible oil is obtained from the seed[2, 4, 183]. The seed contains about 25% oil[4].

tcanta Oil Oil Stuffing The stem hairs are sometimes collected and used to stuff pillows[4]. An oil obtained from the seed is used as a fuel for lamps[4].

dwatta Astringent Cancer CardiotoxicThe flowering plant is cardiotoxic[9]. It is used in some proprietary heart medicines[9]. The juice of the plant has been used with good effect in the treatment of cancers and ulcers[4]. A decoction of the root is astringent[4]. It is used to diminish discharges from mucous membranes[4].

nrakta Europe, possibly including Britain, from Scandinavia south and east to Spain and W. Asia. ksacta Waste places and arable land, especially on chalky and sandy soils, avoiding shade[4, 9]. Also found on slightly acid soils[200].

propta Seed - sow spring in situ[200]. The seed can also be sown in situ in autumn[200]. If the seed is in short supply

nwatta An easily grown plant, succeeding in any ordinary garden soil in a sunny position[200].

6.2.279 Salvia sclarea

Clary, Europe sage, Clary Sage

5 tlin 9 cyuc 2 kcaak 0 tcan 2 dwat 1 m hkuc
htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Salvia sclarea is a BIENNIAL/PERENNIAL growing to 1 m (3ft 3in) by 0.6 m (2ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in August, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: Flowers Leaves OilEdible Uses: Condiment OilLeaves - raw or cooked. A strong, warm, aromatic taste and odour[244]. They are used mainly as a flavouring in cooked foods[2, 27, 37, 105], they are similar to sage (S. officinalis)[1]. The leaves can be dipped in batter and cooked to make delicious fritters[183, 244]. Flowers - raw. A pleasant taste, they can be sprinkled on chopped salads[183, 238], or made into a tea[238]. The plant is sometimes used as a hop substitute in flavouring beer, imparting considerable bitterness and intoxicating properties[4] - it either makes people dead drunk or insanely exhilarated[244]. The leaves have also been used to adulterate wine and give it a muscatel flavour[244].

tcanta Essential OilAn essential oil is obtained from the flowering stems. Called 'Muscatel oil', it has an ambergris aroma and is used in soaps, cosmetics, as a fixative in perfumery etc[1, 46, 74, 171, 238]. A drying oil is obtained from the seed, it is used in varnishes, paints etc[74].

dwatta Antispasmodic Appetizer Aromatherapy Aromatic Astringent Balsamic Carminative Ophthalmic Pectoral TonicClary has been perceived both as a weaker version of sage (Salvia officinalis) and also as a significant herb in its own right[254]. An antispasmodic and aromatic plant, it is used mainly to treat digestive problems such as wind and indigestion[254]. It is also regarded as a tonic, calming herb that helps relieve period pain and pre-menstrual problems. Owing to its oestrogen-stimulating action, it is most effective when levels of this hormone are low[254]. The whole plant, and especially the leaves, is antispasmodic, appetizer, aromatic, astringent, balsamic, carminative, pectoral and tonic[4]. It is useful in treating disorders of the stomach and kidneys and is a valuable remedy for complaints associated with the menopause, particularly hot flushing[4, 254]. It should not be prescribed for pregnant women[238]. The leaves can be used fresh or dried, for drying they are harvested before the plant comes into flower[238]. The seed forms a thick mucilage when it is soaked for a few minutes in water. This is efficacious in removing small particles of dust from the eyes[4, 238]. The essential oil is used in aromatherapy. Its keyword is 'Euphoric'[210].

nrakta Southern Europe to Syria. ksacta Rocky igneous slopes, mixed deciduous and coniferous woodland, shale banks and roadsides to 2000 metres in Turkey[93].

propta Seed - can be sown in situ during spring[1]. Alternatively seed can be sown in August/September to overwinter, it will then produce larger plants Thinnings can be transplanted[1]. The seed remains viable for 3 years[1].

nwatta Landscape Uses:Border, Seashore. Requires a very well-drained light sandy soil in a sunny position[200]. Thrives on any ground that is not too wet[4]. Plants can be killed by excessive winter wet[200]. Hardy to about -20°C[187]. A biennial or short-lived perennial[187]. The flowers can be air-dried and used as everlasting flowers[200]. A very ornamental plant, it is strongly aromatic and is sometimes cultivated for its essential oil, there are some named varieties[74, 183]. When bruised, the leaves release a deliciously pungent and refreshing smell of fresh grapefruit[245]. The flowers are very attractive to bees[245]. Members of this genus are rarely if ever troubled by browsing deer[233]. Special Features: Attractive foliage, Edible, Fragrant foliage, Not North American native, Naturalizing,

Attracts butterflies, Suitable for cut flowers, Fragrant flowers.

6.2.280 Dendranthema x grandiflorum

Chrysanthemum, Cut Mum, Garden Mum, Pot Mum, Florist's Chrysanthemum

5 tlin 10 cyuc 2 kcaak 0 tcan 3 dwat 1.5 m hkuc
htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Dendranthema x grandiflorum is a PERENNIAL growing to 1.5 m (5ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Flowers LeavesEdible Uses: TeaThe flower heads or petals[46, 116, 179] are parboiled and served as a salad with tofu and seasoned with vinegar or soya sauce[183]. They can also be prepared as tempura, pickled, dried or added to soups[183]. The petals contain about 1.9% protein, 0.9% fat, 5.3% carbohydrate, 0.7% ash[179]. Leaves - cooked[46, 105, 179]. Used as fritters, they are aromatic[183]. Some varieties have been selected for their low bitterness[116]. An aromatic tea is made from the leaves[183]. A tangy aromatic tea is made from the flowers or flower petals[179]. For a sweeter tea only the petals are used[183].

tcanta PollutionPlants have been grown indoors in pots in order to help remove toxins from the atmosphere. It is especially good at removing chemical vapours, especially formaldehyde, benzene and ammonia[259].

dwatta Antibacterial Antifungal Carminative Depurative Diaphoretic Febrifuge Ophthalmic Refrigerant SedativeChrysanthemum flowers, known in China as Ju Hua, are a bitter aromatic herb that has been used for thousands of years in Chinese medicine[238, 254]. The flower heads are drunk as a refreshing tisane and are used to improve vision, soothe sore eyes, relieve headaches, counter infections etc[254]. They are antibacterial, antifungal, anti-inflammatory, carminative, depurative, diaphoretic, febrifuge, ophthalmic, refrigerant and sedative[116, 147, 176, 218, 238]. Taken internally they dilate the coronary artery, thus increasing the flow of blood to the heart, and so are used in the treatment of hypertension, coronary heart diseases and angina[238]. The flowers are harvested when fully open in the autumn and are dried for later use[238]. In China they are steamed before being dried to make them less bitter[238]. The leaf juice is smeared onto wounds[218].

nrakta A hybrid of garden origin. ksacta Not known in a truly wild situation.

propta Seed - sow spring to early summer in a greenhouse and only just cover the seed. It usually germinates in 10 - 18 days at 15°C but if it does not germinate within 4 weeks then try chilling the seed for 3 weeks in the salad compartment of a fridge[164]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. This is a hybrid species and so will not breed true from seed. Division in spring. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Landscape Uses:Border, Container, Foundation, Massing, Specimen. Succeeds in most well-drained fertile soils in a sunny position[1, 200]. This species is not fully hardy in Britain, many of its cultivars requiring greenhouse protection in the colder areas of the country[1]. The chrysanthemum is widely cultivated as an ornamental flowering plant[200], there are many named varieties. It is also occasionally grown in the Orient for its edible leaves, a number of cultivars have been developed with leaves that are low in bitterness[116]. It has been proposed (1999) to restore this species to Chrysanthemum as C. x morifolium Ramat. since the plant is so widely known under this name. Special Features:Attractive foliage, Fragrant foliage, Attracts butterflies, Suitable for cut flowers, Suitable for dried flowers,

a shady position[200]. Requires a sunny position according to another report[182]. Plants are hardy to about -20°C[184]. This species grows well in a woodland garden or in a damp shady border[200]. The plants often sucker freely and can form dense thickets[188]. Old plants can be rejuvenated by cutting them back hard into the old wood in late winter, they will resprout freely from the base[200]. Growth can be restricted by removing suckers and cutting old shoots back or down to the base in late winter[188]. Some, if not all plants are dioecious. Male and female plants must be grown if seed is required.

6.2.262 Cornus macrophylla

Large-Leaf Dogwood

5 tlin 9 cyuc 2 kcaak 0 tcan 2 dwat m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Cornus macrophylla is a deciduous Tree growing to 15 m (49ft) by 10 m (32ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 105, 146, 158, 200, 218]. The fruit is about 6mm in diameter[200].

tcanta Charcoal WoodWood - hard, close grained, warps badly[158]. It makes a good charcoal[146, 158].

dwatta Anodyne Astringent Dysentery TonicAnodyne, astringent, tonic[178]. The wood is anodyne and a uterosedative[218]. The stem bark is used in the treatment of dysentery[218].

nrakta E. Asia - China, Japan, Himalayas. ksacta Woodlands, 1200 - 1800 metres in W. China[109]. Slopes, by streams, dense forests, mixed woods and margins of woods from sea level to 3600 metres[266].

propta Seed - best sown as soon as it is ripe in a cold frame or in an outdoors seedbed if there is sufficient seed[80, 113]. The seed must be separated from the fruit flesh since this contains germination inhibitors[80, 164]. Stored seed should be cold stratified for 3 - 4 months and sown as early as possible in the year[164]. Scarification may also help as may a period of warm stratification before the cold stratification[80, 164]. Germination, especially of stored seed, can be very slow, taking 18 months or more[164]. Prick out the seedlings of cold-frame sown seeds into individual pots as soon as they are large enough to handle and grow the plants on for their first winter in a greenhouse, planting out in the spring after the last expected frosts. Cuttings of half-ripe side shoots, July/August in a frame[188]. Cuttings of mature wood of the current year's growth, taken with a heel if possible, autumn in a cold frame. High percentage[78]. Layering of new growth in June/July. Takes 9 months[78].

nwatta An easily grown plant, it succeeds in any soil of good or moderate fertility[1], ranging from acid to shallow chalk[200]. Grows well in heavy clay soils. Succeeds in full sun or light shade[188]. A very ornamental tree[1]. There is some confusion between this species and C. controversa[11]. Plants usually fruit heavily in Britain[11]. The flowers have a soft sweet perfume[245]. Plants in this genus are notably resistant to honey fungus[200].

6.2.263 Hydrangea serrata

Hydrangea, Mountain Hydrangea, Sawtooth Hydrangea

5 tlin 9 cyuc 2 kcaak 0 tcan 0 dwat 2 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatprikliwis hpa7tmwatli xre7t hjonli

drutta Hydrangea serrata is a deciduous Shrub growing to 2 m (6ft) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable

pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

kcakta Edible Parts: LeavesEdible Uses: Young leaves and shoots - cooked[105]. These leaves do not become sweet like those of sssp thunbergii or amagiana or those of H. macrophylla[174].

tcanta Hedge HedgeCan be grown as a low hedge[29], it is quite wind tolerant.

nrakta E. Asia - Japan. ksacta Woodland to 1500 metres[184] in the mountains of C. and S. Japan[58].

propta Seed - surface sow in a greenhouse in spring[113]. Cover the pot with paper until the seed germinates[78]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 8cm long, July/August in a frame. Overwinter in a greenhouse and plant out in late spring[78]. Cuttings of mature wood in late autumn in a frame[200]. Mound layering in spring. Takes 12 months[78]. Leaf-bud cuttings of the current seasons growth in a frame[200].

nwatta Landscape Uses:Container, Seashore, Specimen. Tolerates most soil[200], thriving in a well-drained loamy soil[1], but resenting dryness at the roots[11, 200]. Succeeds in full sun or semi-shade[200], but if it is grown in a low rainfall area then it requires shade at the hottest part of the day[11]. Does well on very acid soils with a pH around 4.5[200]. Tolerates alkaline soils, but it may become chlorotic on shallow soils over chalk[200]. The colour of the flowers reflects the pH of the soil the plant is growing in, the flowers are pink in a neutral to alkaline soil and blue in an acid soil[200]. Plants are hardy to about -25°C when dormant but the young growth in spring can be killed by late frosts. A very ornamental plant, there are many named varieties[182]. Considerable difficulties exist in the nomenclature for this species and H. macrophylla. They are treated here in accordance with "Bean's Manual of Trees and Shrubs", though many botanists view H. serrata as no more than a sub-species of H. macrophylla. This species is notably susceptible to honey fungus[200]. Special Features: Not North American native, Blooms are very showy.

6.2.264 Rubus adenophorus

5 tlin 9 cyuc 2 kcaak 0 tcan 0 dwat 2.5 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Rubus adenophorus is a deciduous Shrub growing to 2.5 m (8ft 2in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to June, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[1, 11, 105]. The fruit is about 12mm in diameter[200].

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

nrakta E. Asia - C. China. ksacta Mountainous regions, valleys, sparse forests, forest margins and thickets at low to medium elevations[266].

propta Seed - requires stratification and is best sown in early autumn in a cold frame. Stored seed requires one month stratification at about 3°C and is best sown as early as possible in the year. Prick out the seedlings when they are large enough to handle and grow on in a cold frame. Plant them out into their permanent positions in late spring of the following year. Division in early spring or just before leaf-fall in the autumn[200].

nwatta Easily grown in a good well-drained loamy soil in sun or semi-shade[1, 11, 200]. This species is a raspberry with biennial stems[200]. New shoots are produced from the roots each year, these flower and fruit in their second year

and then die[200]. Plants in this genus are notably susceptible to honey fungus[200].

6.2.265 Arum maculatum

Cuckoo Pint

5 tlin 9 cyuc 2 kcaok 0 tcan 1 dwat m hkuc
pcimhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli hjonli

drutta Arum maculatum is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from April to May, and the seeds ripen from July to August. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The plant contains calcium oxylate crystals. These cause an extremely unpleasant sensation similar to needles being stuck into the mouth and tongue if they are eaten, but they are easily neutralized by thoroughly drying or cooking the plant or by steeping it in water[65].

kcaakta Edible Parts: Leaves RootEdible Uses: Tuber - cooked and used as a vegetable[2, 177]. A mild flavour, the root contains about 25% starch[74]. A farina can be extracted from the root[2]. Roots can be harvested at any time of the year, though they are best when the plant is dormant[K]. At one time, the tubers of this plant were commonly harvested and used for food, but they are very rarely used nowadays[268, K]. The root must be thoroughly dried or cooked before being eaten, see the notes above on toxicity. Leaves - must be well cooked[177]. Available from late winter. Caution is advised, see the notes above on toxicity.

tcanta StarchStarch from the root has been used as a laundry starch for stiffening clothes[4, 66, 100]. Its use is said to be very harsh on the skin, producing sores and blisters on the hands of the laundresses who have to use it[66, 100], though another report says that the powdered root makes a good and innocent cosmetic that can be used to remove freckles[4].

dwatta Antirheumatic Diaphoretic Diuretic Expectorant Homeopathy Purgative VermifugeCuckoo pint has been little used in herbal medicine and is generally not recommended for internal use[268]. The shape of the flowering spadix has a distinct sexual symbolism and the plant did have a reputation as an aphrodisiac, though there is no evidence to support this[268]. The root is diaphoretic, diuretic, expectorant, strongly purgative and vermifuge[4, 9, 19, 21]. It should be harvested in the autumn or before the leaves are produced in the spring[4]. It can be stored fresh in a cellar in sand for up to a year or can be dried for later use[4]. The plant should be used with caution[9], see notes above on toxicity. The bruised fresh plant has been applied externally in the treatment of rheumatic pain[268]. A liquid from the boiled bark (of the stem?[K]) has been used in the treatment of diarrhoea[213]. A homeopathic remedy is prepared from the root and leaves[4]. It has been used in the treatment of sore throats[4, 268].

nrakta Most of Europe, south and east of Sweden, including Britain, south to N. Africa. ksacta Hedgerows, woodlands, copses etc, especially on base-rich substrata[9, 17].

propta Seed - best sown in a greenhouse or cold frame as soon as it is ripe[134]. The seed usually germinates in 1 - 6 months at 15°C[134]. Stored seed should be sown in the spring in a greenhouse and can be slow to germinate, sometimes taking a year or more. A period of cold stratification might help to speed up the process. Sow the seed thinly, and allow the seedlings to grow on without disturbance for their first year, giving occasional liquid feeds to ensure that they do not become mineral deficient. When the plants are dormant in the autumn, divide up the small corms, planting 2 - 3 in each pot, and grow them on in light shade in the greenhouse for a further year, planting out when dormant in the autumn. Division of the corms in summer after flowering[200]. Larger corms can be planted out direct into their permanent positions, though it is best to pot up the smaller corms and grow them on for a year in a cold frame before planting them out.

nwatta Prefers a humus rich soil and abundant water in the growing season[1, 13]. Prefers a shady damp calcareous soil[13, 31]. Succeeds in sun or shade[90]. Plants are very shade tolerant[17] and grow well in woodland conditions[1]. The inflorescence has the remarkable ability to heat itself above the ambient air temperature to such a degree that it is quite noticeable to the touch[4]. Temperature rises of 11°C have been recorded[245]. At the same time, the flowers emit a foul and urinous smell in order to attract midges for pollination[245]. The smell disappears once the flower has been pollinated[245]. Members of this genus are rarely if ever troubled by browsing deer[233].

6.2.266 Rubus bellobatus

Kittatinny Blackberry

5 tlin 9 cyuc 2 kcaok 0 tcan 0 dwat 2 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta Rubus bellobatus is a deciduous Shrub growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 6. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects, Apomictic (reproduce by seeds formed without sexual fusion). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcaakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177]. The oblong fruit is about 30mm long[200]. tcanta DyeA purple to dull blue dye is obtained from the fruit[168].

nrakta North-eastern N. America. ksacta Thickets and woodland edges[43].

propta Seed - requires stratification and is best sown in early autumn in a cold frame. Stored seed requires one month stratification at about 3°C and is best sown as early as possible in the year. Prick out the seedlings when they are large enough to handle and grow on in a cold frame. Plant them out into their permanent positions in late spring of the following year. Cuttings of half-ripe wood, July/August in a frame[200]. Tip layering in July. Plant out in autumn. Division in early spring or just before leaf-fall in the autumn[200].

nwatta Easily grown in a good well-drained loamy soil in sun or semi-shade[1, 11, 200]. This species is a blackberry with biennial stems, it produces a number of new stems each year from the perennial rootstock, these stems fruit in their second year and then die[200]. A parent of many cultivated forms of blackberry in N. America, the cultivar 'Kittatinny' has been available in Britain[11]. The plant produces apomictic flowers, these produce fruit and viable seed without fertilization, each seedling is a genetic copy of the parent[200] Plants in this genus are notably susceptible to honey fungus[200].

6.2.267 Quercus mongolica

Mongolian oak

5 tlin 8 cyuc 2 kcaok 0 tcan 2 dwat m hkuc
hmimhtut cyutli tcup hwicli jlutnyik hpa7tli flatprikliwis hpa7tmwatli hjonli

drutta Quercus mongolica is a deciduous Tree growing to 30 m (98ft 5in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from May to June, and the seeds ripen from October to November. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

kcaakta Edible Parts: SeedEdible Uses: CoffeeSeed - cooked[63, 105]. The seed is about 2cm long[200], it can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed contains bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will

with other members of this genus[1]. Plants can be pruned back quite severely and resprout well from the base[200].

6.2.277 Lavandula angustifolia

English Lavender, True Lavender

5 tlin 8 cyuc 2 kcaok 5 tcan 3 dwat 1.2 m hkuc
htut cyutli hgtakuyctucp hwicli hrasjlutnyik hpa7tli flatprikliwisshilpsom hpa7tmwatli xre7t hjonli

drutta Lavandula angustifolia is an evergreen Shrub growing to 1.2 m (4ft) by 1 m (3ft 3in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline and saline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

pcista The volatile oil may rarely cause sensitization [301].

kcaakta Edible Parts: Edible Uses: Condiment TeaLeaves, petals and flowering tips - raw. Used as a condiment in salads, soups, stews etc[2, 15, 183]. They provide a very aromatic flavour[7] and are too strong to be used in any quantity[K]. The fresh or dried flowers are used as a tea[183]. The fresh flowers are also crystallized or added to jams, ice-creams, vinegars etc as a flavouring[238]. An essential oil from the flowers is used as a food flavouring[183].

tcanta Companion Essential Hedge Incense Pot-pourri RepellentThe essential oil that is obtained from the flowers is exquisitely scented and has a very wide range of applications, both in the home and commercially. It is commonly used in soap making, in making high quality perfumes (it is also used in 'Eau de Cologne'), it is also used as a detergent and cleaning agent, a food flavouring etc[21, 46, 57, 171, 238] and as an insect repellent[201]. When growing the plant for its essential oil content, it is best to harvest the flowering stems as soon as the flowers have faded[245]. Yields of 0.8 - 1% of the oil are obtained[7]. The aromatic leaves and flowers are used in pot-pourri[238] and as an insect repellent in the linen cupboard etc[14, 18, 20]. They have been used in the past as a strewing herb in order to impart a sweet smell to rooms and to deter insects[244]. The leaves are also added to bath water for their fragrance and therapeutic properties[244]. They are also said to repel mice[20]. The flowering stems, once the flowers have been removed for use in pot-pourri etc, can be tied in small bundles and burnt as incense sticks[245]. Lavender can be grown as a low hedge, responding well to trimming[29]. There are several varieties, such as 'Hidcote Variety', 'Loddon Pink' and 'Folgate Blue' that are suitable for using as dwarf hedges 30 - 50cm tall[245].

dwatta Antianxiety Antihalitosis Antiseptic Antispasmodic Appetizer Aromatherapy Aromatic Carminative Cholagogue Diuretic Nervine Sedative Stimulant Stomachic TonicLavender is a commonly used household herb, though it is better known for its sweet-scented aroma than for its medicinal qualities[254]. However, it is an important relaxing herb, having a soothing and relaxing affect upon the nervous system[254]. The flowering spikes can be dried and used internally in a tincture, though the extracted essential oil is more commonly used. The essential oil is much more gentle in its action than most other essential oils and can be safely applied direct to the skin as an antiseptic to help heal wounds, burns etc[254]. An essential oil obtained from the flowers is antihalitosis, powerfully antiseptic, antispasmodic, aromatic, carminative, cholagogue, diuretic, nervine, sedative, stimulant, stomachic and tonic[4, 7, 9, 21, 165, 238]. It is not often used internally, though it is a useful carminative and nervine[4]. It is mainly used externally where it is an excellent restorative and tonic - when rubbed into the temples, for example, it can cure a nervous headache, and it is a delightful addition to the bath-water[4]. Its powerful antiseptic properties are able to kill many of the common bacteria such as typhoid, diphtheria, streptococcus and Pneumococcus, as well as being a powerful antidote to some snake venoms[244]. It is very useful in the treatment of burns, sunburn, scalds, bites, vaginal discharge, anal fissure etc, where

it also soothes the affected part of the body and can prevent the formation of permanent scar tissue[4, 238]. The essential oil is used in aromatherapy. Its keyword is 'Immune system'[210]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Lavandula angustifolia for loss of appetite, nervousness and insomnia, circulatory disorders, dyspeptic complaints (see [302] for critics of commission E).

nrakta Europe - Mediterranean. ksacta Dry grassy slopes amongst rocks[9], in exposed, usually parched, hot rocky situations often on calcareous soils[200].

propta Seed - sow spring in a greenhouse and only just cover the seed[4]. It usually germinates in 1 - 3 months at 15°C. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse or cold frame for their first winter, planting them out in late spring after the last expected frosts. Cuttings of half-ripe wood 7 - 10cm with a heel, July/August in a frame. Usually very east, a high percentage will root within a few weeks[78]. Grow them on in the greenhouse for their first winter and plant them out in late spring after the last expected frosts. Cuttings 7cm with a heel succeed at almost any time of the year[1]. Layering.

nwatta Landscape Uses:Alpine garden, Border, Container, Ground cover, Massing, Rock garden, Seashore, Specimen. Succeeds in almost any soil so long as it is well-drained and not too acid[1, 200]. Prefers a sunny position in a neutral to alkaline soil[1, 4, 14]. Prefers a light warm dry soil[37]. When grown in rich soils the plants tend to produce more leaves but less essential oils[4]. Established plants are drought tolerant[190]. Plants are very tolerant of salt wind exposure[K]. When growing for maximum essential oil content, the plant must be given a very warm sunny position and will do best in a light sandy soil, the fragrance being especially pronounced in a chalky soil[245]. Plants are hardy to between -10 and -15°C[184]. Lavender is a very ornamental plant that is often grown in the herb garden and is also grown commercially for its essential oil[1, 4]. There are several named varieties[182, 183]. Not a very long-lived plant, it can be trimmed to keep it tidy but is probably best replaced every 10 years[200]. Any trimming is best done in spring and should not be done in the autumn since this can encourage new growth that will not be very cold-hardy[200]. A good bee plant, also attracting butterflies and moths[7, 24, 30]. Lavender makes a good companion for most plants[54], growing especially well with cabbages[14]. Special Features: Attractive foliage, Fragrant foliage, Not North American native, Attracts butterflies, Suitable for cut flowers, Suitable for dried flowers, Fragrant flowers, Attractive flowers or blooms.

6.2.278 Cirsium eriophorum

Woolly Thistle

5 tlin 9 cyuc 2 kcaok 0 tcan 0 dwat 1.5 m hkuc
htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta Cirsium eriophorum is a BIENNIAL growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies), beetles. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcaakta Edible Parts: Flowers Leaves Oil StemEdible Uses: OilYoung leaves - raw[4, 183]. Young stems - raw or cooked. An asparagus or rhubarb substitute[4, 12, 183]. The stems are peeled and soaked in water to remove the bitterness, they are then said to be excellent eating[4, 183]. Flower buds - cooked. A globe artichoke substitute[2, 177, 183] but much smaller and even more fiddly.

tcanta Oil TinnerThe seed fluff is used as a tinder[106]. The seed of all species of thistles yields a good oil by expression[4]. No details of potential yields etc are given[K].

nrakta Central Europe, from Britain, France and Holland to the Balkans and Upper Volga ksacta Grassland, open scrub and roadsides on calcareous soils[12, 17].

propta Seed - sow early spring or autumn in situ. Germination usually takes place within 2 - 8 weeks at 20°C.

nrakta W. Asia - Central Iran, Turkey and southern Russia. ksacta Herbaceous slopes in steppes[74].

propta Seed - best sown as soon as the seed is ripe in a greenhouse in autumn[1]. Otherwise sow in April in a greenhouse. Prick out the seedlings into individual pots as soon as they are large enough to handle. Plant them out into their permanent positions whilst still small because the plants dislike root disturbance[1]. Give the plants a protective mulch for at least their first winter outdoors. Division in autumn. This may be inadvisable due to the plants dislike of root disturbance.

nwatta Succeeds in most soils[1]. Requires a deep fertile soil in a sunny position[200]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°C[200]. Another report says that it tolerates temperatures down to at least -15°C and should therefore succeed outdoors in most parts of the country[238]. Plants are intolerant of root disturbance due to their long taproot[200]. They should be planted into their final positions as soon as possible. The flowers have an unpleasant smell[245].

6.2.275 *Mentha longifolia*

Horsemint

5 tlin 9 cyuc 2 kcaok 0 tcan 2 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlnutyikfrp hpa7tli flatprikwis hpa7tmwatli xre7t hjonli

drutta *Mentha longifolia* is a PERENNIAL growing to 1 m (3ft 3in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from August to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

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

kcakta Edible Parts: LeavesEdible Uses: Condiment TeaLeaves - raw or cooked. Peppermint-scented, they are used as a flavouring in salads, chutneys and cooked foods[183, 238]. A herb tea is made from the leaves[183]. An essential oil obtained from the leaves and flowering tops is used as a food flavouring in sweets etc[183]. A peppermint-like taste[183].

tcanta Essential Repellent StrewingThe leaves contain about 0.57% essential oil[240]. It is sometimes used as a substitute for peppermint oil in confectionery[238]. Rats and mice intensely dislike the smell of mint. The plant was therefore used in homes as a strewing herb and has also been spread in granaries to keep the rodents off the grain[244].

dwatta Antiasthmatic Antiseptic Antispasmodic Carmi-native StimulantHorsemint, like many other members of this genus, is often used as a domestic herbal remedy, being valued especially for its antiseptic properties and its beneficial effect on the digestion. Like other members of the genus, it is best not used by pregnant women because large doses can cause an abortion. The leaves and flowering stems are antiasthmatic, antispasmodic, carminative and stimulant[4, 148, 240]. A tea made from the leaves has traditionally been used in the treatment of fevers, headaches, digestive disorders and various minor ailments[222]. The leaves are harvested as the plant comes into flower and can be dried for later use[238]. The essential oil in the leaves is antiseptic, though it is toxic in large doses[222].

nrakta Central and southern Europe, including Britain, Mediterranean region, Siberia. ksacta Waste places and damp roadsides[17].

propta Seed - sow spring in a cold frame. Germination is usually fairly quick. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. *Mentha* species are very prone to hybridisation and so the seed cannot be relied on to breed true. Even without hybridisation, seedlings will not be uniform and so the content of medicinal oils etc will vary. When growing plants with a particular aroma it is best to propagate them by

division[K]. Division can be easily carried out at almost any time of the year, though it is probably best done in the spring or autumn to allow the plant to establish more quickly. Virtually any part of the root is capable of growing into a new plant. Larger divisions can be planted out direct into their permanent positions. However, for maximum increase it is possible to divide the roots up into sections no more than 3cm long and pot these up in light shade in a cold frame. They will quickly become established and can be planted out in the summer.

nwatta An easily grown plant, it succeeds in most soils and situations so long as the soil is not too dry[1, 200]. Grows well in heavy clay soils. A sunny position is best for production of essential oils, but the plants also succeed in partial shade. There is some confusion over the name of this plant, it appears in the British flora[17] but according to Flora Europaea it is not found in Britain[50]. Sometimes cultivated for its leaves, there are some named varieties[183]. Most mints have fairly aggressive spreading roots and, unless you have the space to let them roam, they need to be restrained by some means such as planting them in containers that are buried in the soil[K]. Hybridizes freely with other members of this genus. The whole plant has a mint-like aroma. The flowers are very attractive to bees and butterflies. A good companion plant for growing near cabbages and tomatoes, helping to keep them free of insect pests. Members of this genus are rarely if ever troubled by browsing deer[233].

6.2.276 *Berberis sikkimensis*

5 tlin 9 cyuc 2 kcaok 0 tcan 2 dwat 1.5 m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasjlnutyikfrp hpa7tli flatprikwis hpa7tmwatli fyfjxre7t hjonli

drutta *Berberis sikkimensis* is a deciduous Shrub growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[K]. A fairly acid flavour, it is acceptable raw in small quantities, and children seem to like it. Generally, though, most people will prefer to cook it[K].

tcanta DyeA yellow dye is obtained from the root.

dwatta Antibacterial Cancer DysenteryBerberine, universally present in rhizomes of *Berberis* species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with *Glycyrrhiza* species (Licorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta E. Asia - Sikkim. ksacta Found at elevations of 2,100 - 4,200 metres in the Himalayas.

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78]. Suckers, removed in late autumn/early winter and planted out in situ or potted up and planted out in late spring[200].

nwatta Prefers a warm moist loamy soil and light shade but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. This species is closely related to *B. chitralia*[11]. Hybridizes freely

also be lost. Either the whole seed can be used or the seed can be dried and ground into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute.

tcanta Charcoal Repellent Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. Wood. Used for construction and charcoal[46, 61].

dwatta Astringent DysenteryAny galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta E. Asia - China, Japan. ksacta Woods in the cooler areas of Japan[58]. Mixed mesophytic forests at elevations of 200 - 2500 metres in northern and eastern China[266].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Landscape Uses:Specimen, Street tree. Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. Prefers warmer summers than are usually experienced in Britain, trees often grow poorly in this country and fail to properly ripen their wood resulting in frost damage overwinter[200]. The seed ripens in its first year[200]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200]. Special Features:Not North American native, Inconspicuous flowers or blooms.

6.2.268 *Prunus glandulosa*

Korean Cherry, Dwarf Flowering Almond

5 tlin 8 cyuc 2 kcaok 0 tcan 1 dwat 1 m hkuc htut cyutli kyuctcup hwicli hrasjlnutyik hpa7tli flatprikwis hpa7tmwatli xre7t hjonli

drutta *Prunus glandulosa* is a deciduous Shrub growing to 1 m (3ft 3in) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from April to May, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: Fruit SeedEdible Uses: Fruit - preserved or pickled[74, 177, 183]. The fruit is about 10mm in

diameter and contains one large seed[200]. Seed - raw or cooked. Do not eat the seed if it is too bitter - see the notes above on toxicity.

tcanta DyeA green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168].

dwatta Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta E. Asia - China, Japan. ksacta Open stony dry slopes and rocks, open sunny places, solitary or in small groves[74]. Mountain slopes, sides of ravines and thickets at elevations of 800 - 2300 metres[266].

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200]. Softwood cuttings from strongly growing plants in spring to early summer in a frame[200]. Layering in spring.

nwatta Thrives in a well-drained moisture-retentive loamy soil[11, 200]. Prefers some lime in the soil but is likely to become chlorotic if too much lime is present[1]. Succeeds in sun or partial shade though it fruits better in a sunny position[11, 200]. Plants flower best when grown against a south or west-facing wall[188]. A very ornamental plant[1]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features: Not North American native, Fragrant flowers, Attractive flowers or blooms.

6.2.269 *Leymus arenarius*

Lyme Grass, Sand ryegrass

5 tlin 9 cyuc 2 kcaok 0 tcan 0 dwat 1.2 m hkuc htut cyutli hgatyuctcup hwicli hyishrasjlnutyik hpa7tli flatprikwis hpa7tmwatli xre7t hjonli

drutta *Leymus arenarius* is a PERENNIAL growing to 1.2 m (4ft) by 2 m (6ft 7in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from May to July, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

kcakta Edible Parts: SeedEdible Uses: Seed - cooked[2, 105]. It can be ground into a flour and used to make bread[13]. A delicious taste[183] but very fiddly to use, the seed is small and hard to extract[K]. When cooked like rice, it can be used as a sweet or savoury dish. Mixed 50/50 with wheat flour it adds a richness to biscuits etc[183]. The protein content of this grain is said to rival that of red beans or salmon[183]. (This report seems somewhat surprising, protein levels are not usually anywhere near that high in a cereal[K].)

tcanta Fibre Soil stabilization WeavingThe leaves are used for making mats, rope, paper etc[46, 61]. The plants have a very extensive root system and so they are often planted near the coast in order to stabilize sand dunes[190, 200]. They can also be used as a ground cover for sandy open spaces but can be invasive[200, 208].

nrakta Europe, including Britain, from Scandinavia south and east to Spain and Siberia. N. America. ksacta Dunes by the coast, often in association with *Ammophila arenaria*[17].

propta Seed - sow mid spring in situ and only just cover the seed[162]. Germination should take place within 2 weeks. If the supply of seed is limited, it can also be sown in

mid spring in a cold frame. Only just cover the seed. When large enough to handle, prick the seedlings out into individual pots and plant them out in summer[K] Division in spring or summer[162]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Staple Crop: Balanced carb Wild-collected as FoodAn easily grown plant, it succeeds in most soils, preferring a sandy soil[1] and a sunny position[162]. Established plants are very drought tolerant[190]. A very invasive plant, spreading by means of its wide-ranging roots[1, 187]. Cultivated in Japan for making mats etc[46, 61]. The Viking settlers of Iceland cultivated this plant until the beginning of the 20th century for its edible seed[183].

6.2.270 Berberis fendleri

Colorado Barberry

5 tlin 9 cyuc 2 kcaak 0 tcan 2 dwat 1.5 m hkuc hmimhtut cyutli kyuctup hwicli hyishrasljutnyik hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta Berberis fendleri is a deciduous Shrub growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 161, 177, 257]. The fruits are about 5mm long[200].

tcanta DyeA yellow dye is obtained from the root.

dwatta Antibacterial Cancer DysenteryBerberine, universally present in rhizomes of Berberis species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Licquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumor activity[218].

nrakta South-western N. America - Colorado, New Mexico and Utah. ksacta Slopes and canyon bottoms at elevations of 1300 - 2700 metres[270].

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78].

nwatta Prefers a warm moist loamy soil but is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. Succeeds in full sun or light shade[11, 200]. Hybridizes freely with other members of this genus[1]. Plants can be pruned back quite severely, they resprout well from the base[200].

6.2.271 Phytolacca esculenta

5 tlin 9 cyuc 2 kcaak 0 tcan 2 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Phytolacca esculenta is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs).

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

pcista The leaves are poisonous[147]. They are said to be alright to eat when young, the toxins developing as they grow older.

kcakta Edible Parts: Leaves RootEdible Uses: Leaves - they must be cooked and are used as a spinach[1, 58, 105, 174, 183]. Only the young leaves should be used since they become toxic with age. Root - cooked[105, 183].

tcanta InkA red ink is obtained from the fruit[57].

dwatta Abortifacient Antisthmatic Antibacterial Antifungal Antinflammatory Antiphlogistic Antitussive Diuretic Expectorant Hypotensive PurgativeThe roots contain saponins[279]. They are abortifacient, antiasthmatic, antibacterial, antifungal, antiinflammatory, antiphlogistic, antitussive, diuretic, expectorant, hypotensive and purgative[147, 174, 176, 279]. A decoction is used in the treatment of oedema, beri-beri, lumbago, rheumatism, abdominal distension and numbness of the throat[147, 176, 279]. Use with caution, see the notes above on toxicity[176].

nrakta E. Asia - China. ksacta Valleys, hillsides, forest understories, forest margins and roadsides at elevations of 500 - 3400 metres[266]. It is also found in cultivated land houses, moist fertile lands and as a weed[266].

propta Seed - sow autumn or spring in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. If you have sufficient seed, it might be worthwhile trying an outdoor sowing in a seed bed in early spring. Grow the plants on in the seedbed for their first year and plant them out the following spring. Division in March or October. Use a sharp spade or knife to divide the rootstock, making sure that each section has at least one growth bud. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta An easily grown plant, succeeding in most soils[1], though preferring a moisture retentive soil in full sun or partial shade[200]. We have found the plants to be very tolerant of drought[K]. Plants can be grown in quite coarse grass, which can be cut annually in the autumn[233]. The young growth in spring can be damaged by late frosts. There is sme disagreement over the correct name for this species with some authorities saying that it is no more than a synonym for *P. acinosa*[266], whilst others give it specific status[200]. There are reports that there is a white flowered plant, which could either be this species or a form of *P. acinosa* which is said to be non-toxic and to have an edible root[K]. See *P. acinosa* for more details. Plants seem to be immune to the predations of rabbits[233].

6.2.272 Lavandula x intermedia

Lavender, Lavandin

5 tlin 9 cyuc 2 kcaak 5 tcan 2 dwat 1.2 m hkuc

htut cyutli hgatkuyctcup hwicli hrasljutnyik hpa7tli flatprikli-wissliphsom hpa7tmwatli xre7t hjonli

drutta Lavandula x intermedia is an evergreen Shrub growing to 1.2 m (4ft) by 1 m (3ft 3in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline and saline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

kcakta Edible Parts: Edible Uses: Condiment TeaThe following uses are for *L. angustifolia*, they should also apply to this hybrid:- Leaves, petals and flowering tips - raw. Used as a condiment in salads, soups, stews etc[2, 15, 183]. They provide a very aromatic flavour[7] and are too strong

to be used in any quantity[K]. The fresh or dried flowers are added to a tea[183]. The fresh flowers are also crystallized or used to jams, ice-creams, vinegars etc as a flavouring[238]. An essential oil from the flowers is used as a food flavouring[183].

tcanta Companion Essential Hedge Hedge Incense Potpourri RepellentThe following uses are for the closely related *L. angustifolia*, they should also apply to this hybrid:- The essential oil that is obtained from the flowers is exquisitely scented and has a very wide range of applications, both in the home and commercially. It is commonly used in soap making, in making high quality perfumes (it is also used in 'Eau de Cologne'), it is also used as a detergent and cleaning agent, a food flavouring etc[21, 46, 57, 171, 238] and as an insect repellent[201]. Yields of 0.8 - 1% of the oil are obtained[7]. When growing the plant for its essential oil content, it is best to harvest the flowering stems as soon as the flowers have faded[245]. The aromatic leaves and flowers are used in pot-pourri[238] and as an insect repellent in the linen cupboard etc[14, 18, 20]. They are also said to repel mice[20]. The flowering stems, once the flowers have been removed for use in pot-pourri etc, can be tied in small bundles and burnt as incense sticks[245]. Can be grown as a low hedge, responding well to trimming[29].

dwatta Antihailitosis Antiseptic Antispasmodic Aromatherapy Aromatic Carminative Cholagogue Diuretic Nerve Sedative Stimulant Stomachic TonicThe following uses are for *L. angustifolia*, they should also apply to this hybrid:- Lavender is a commonly used household herbal remedy. An essential oil obtained from the flowers is antihailitosis, antiseptic, antispasmodic, aromatic, carminative, cholagogue, diuretic, nervine, sedative, stimulant, stomachic and tonic[4, 7, 9, 21, 165, 238]. It is not often used internally, though it is a useful carminative and nervine[4]. It is mainly used externally where it is an excellent restorative and tonic - when rubbed into the temples, for example, it can cure a nervous headache, and it is a delightful addition to the bath-water[4]. Its antiseptic properties also make it useful in the treatment of burns, sunburn, scalds, bites, vaginal discharge, anal fissure etc, where it also soothes the affected part of the body and can prevent the formation of permanent scar tissue[4, 238]. The essential oil is used in aromatherapy. Its keyword is 'Immune system'[210].

nrakta A hybrid species of garden origin, *L. angustifolia* x *L. latifolia*. ksacta Not known in the wild,

propta Seed - sow spring in a greenhouse and only just cover the seed[4]. It usually germinates in 1 - 3 months at 15°C. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse or cold frame for their first winter, planting them out in late spring after the last expected frosts. This species is a hybrid and will not come true from seed. Cuttings of half-ripe wood 7 - 10cm with a heel, July/August in a frame. Usually very east, a high percentage will root within a few weeks[78]. Grow them on in the greenhouse for their first winter and plant them out in late spring after the last expected frosts. Cuttings 7cm with a heel succeed at almost any time of the year[1]. Layering.

nwatta Landscape Uses:Alpine garden, Border, Container, Ground cover, Massing, Rock garden, Seashore, Specimen. Succeeds in almost any soil so long as it is well-drained and not too acid[1, 200]. Prefers a sunny position in a neutral to alkaline soil[1, 4, 14]. Prefers a light warm dry soil[37]. When grown in rich soils the plants tend to produce more leaves but less essential oils[4]. Established plants are drought tolerant[190]. Very tolerant of salt wind exposure[K]. When growing for maximum essential oil content, the plant must be given a very warm sunny position and will do best in a light sandy soil, the fragrance being especially pronounced in a chalky soil[245]. Plants are hardy to between -10 and -15°C[184]. Lavender is a very ornamental plant that is often grown in the herb garden and is also grown commercially for its essential oil[1, 4]. This species is a very variable hybrid between the two main species of lavender, *L. angustifolia* and *L. latifolia*[200], There are several named varieties[200, 238]. Not a very long-lived plant, it can be trimmed to keep it tidy but is probably best replaced every 10 years[200]. Any trimming is best done in spring and should not be done in the autumn since this can encourage new growth that will not be very cold-hardy[200]. A good bee plant, also attracting butterflies and moths[7, 24, 30]. Lavender makes a good companion for most plants[54], growing

especially well with cabbages[14]. Special Features: Attractive foliage, Fragrant foliage, Not North American native, Attracts butterflies, Suitable for cut flowers, Suitable for dried flowers, Extended bloom season in Zones 9A and above, Fragrant flowers, Attractive flowers or blooms.

6.2.273 Lonicera venulosa

5 tlin 9 cyuc 2 kcaak 0 tcan 0 dwat 1.5 m hkuc htut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Lonicera venulosa is a deciduous Shrub growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: The following report is for the closely related *L. villosa*, it would be worthwhile experimenting with this plant to check on edibility[K]. Fruit - raw or preserved[43, 105, 200]. A milder flavour than most edible honeysuckles, they can be eaten raw but are mainly used in making jams, jellies and refreshing drinks[183].

nrakta E. Asia - Japan. ksacta In alpine regions at elevations of 800 - 2800 metres[275].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed requires 2 months cold stratification[113] and should be sown as soon as possible in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm with or without a heel, July/August in a frame. Good percentage[78]. Cuttings of mature wood of the current season's growth, 15 - 20cm with or without a heel, November in a cold frame. Good percentage[78]. Layering in autumn[200].

nwatta Grows best in a good moist soil in a sunny position, it does not fruit so well in the shade[200]. Closely related to *L. caerulea*[200].

6.2.274 Ferula gummosa

Galbanum

5 tlin 9 cyuc 2 kcaak 0 tcan 2 dwat 1 m hkuc

htut cyutli kyuctup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta Ferula gummosa is a PERENNIAL growing to 1 m (3ft 3in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to June, and the seeds ripen from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: Edible Uses: CondimentThe gum resin obtained from the root is used as a celery-like food flavouring[177, 238].

tcanta The aromatic gum resin 'Galbanum' is obtained from wounds made in the stem[4]. It is collected by removing soil from around the top of the root and then cutting a slice off the root[64, 238] and can also be obtained from incisions made in the stem[238]. It is used medicinally and is also an ingredient of incense[1, 64, 171, 238]. It was an important ingredient of the incense used by the Israelites[268].

dwatta Antispasmodic Carminative Expectorant StimulantThe whole plant, but especially the root, contains the gum resin 'galbanum'[4]. This is antispasmodic, carminative, expectorant and stimulant[4, 46, 64, 238]. It is used internally in the treatment of chronic bronchitis, asthma and other chest complaints[4, 238]. It is a digestive stimulant and antispasmodic, reducing flatulence, griping pains and colic[254]. Externally it is used as a plaster for inflammatory swellings, ulcers, boils, wounds and skin complaints[4, 238].

pcista Avoid during pregnancy and breastfeeding. Avoid if on anticoagulants or ticlodipine (for blood clot formation) [301].

kcakta Edible Parts: LeavesEdible Uses: Drink TeaY-oung leaves and shoots - cooked as a vegetable[272]. The roots are chewed, used as a flavouring in liqueurs or made into a tea[183].

dwatta Antibacterial Antiinflammatory Antiseptic Aphrodisiac Cardiotonic Diuretic Expectorant Haemostatic Hypoglycaemic StimulantThe roots and the flowers are anti-bacterial, anti-inflammatory, antiseptic, aphrodisiac, cardiotonic, diuretic, expectorant, haemostatic, hypoglycaemic and stimulant[176, 238, 272]. The root is used internally in the treatment of indigestion, vomiting, coronary heart disease and angina[238, 272]. The roots are also used both internally and externally in the treatment of nosebleeds, haemorrhages from the lungs, digestive tract and uterus, and injuries[238]. The roots are harvested in the autumn, preferably from plants 6 - 7 years old, and can be used fresh or dried[238]. The flowers are used to treat vertigo and dizziness[238].

nrakta E. Asia - China to the Himalayas and Burma. ksacta Forests and shrubberies, 2100 - 4300 metres in C. Nepal in the Himalayas[51]. Moist shady places at elevations of 2000 - 3300 metres in Nepal[272].

propta Seed - sow in a shady position in a cold frame preferably as soon as it is ripe, otherwise as soon as the seed is obtained. It can be very slow and erratic to germinate. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a shady position in the greenhouse or frame for at least their first winter. Make sure the pots are deep enough to accommodate the roots. Plant out into their permanent positions in late summer. Division in spring.

nwatta Requires a moist humus rich soil in a shady position in a woodland[200]. Plants are hardy to at least -15°c[238]. Nomenclature of this genus is rather confused with some botanists recognising *P. ginseng* as a variable plant that includes this species. Other botanists divide it into 4 or even 5 distinct species, giving this plant specific status. This plant has been grossly over-collected from the wild for its use as a medicinal plant and it is rapidly approaching extinction in most parts of its range[238]. The sub-species *P. pseudo-ginseng* notoginseng. (Burkill,)Hoo. and Tseng. is the form used medicinally in China[176], this plant is given a separate entry in this database[K].

6.2.404 Chelidonium majus

Greater Celandine, Swallow Wort, Greater Celandine
5 tlin 8 cyuc 1 kcaak 0 tcan 3 dwat m hkuc
pcimhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flat-prikliwis hpa7tmwatli fyfxre7t hjonli

drutta Chelidonium majus is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.4 m (1ft 4in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from May to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The whole plant is poisonous[7, 10, 19]. It is of very low toxicity and this is greatly reduced by drying the plant[65]. The stem juice is highly irritating and allergenic, it may cause paralysis[222]. Large doses cause sleepiness, skin irritation, respiratory tract irritation, violent coughing and dyspnoea[268]. It also stains the urine bright yellow and may cause ulcers[268]. May cause burning sensation in the mouth, nausea and vomiting. Avoid contact with eyes. Concerns of liver toxicity so avoid in those with liver disease. Not recommended during pregnancy and for children under 12 [301].

kcakta Edible Parts: Leaves OilEdible Uses: OilLeaves - cooked in small quantities[177]. They contain small amounts of toxic alkaloids[179]. The leaves are boiled with clean earth, the mixture is left overnight and then thoroughly washed in several changes of water[179]. Very much a famine food, to be used when all else fails!![K].

tcanta OilPlants rapidly form a ground cover, but should only be used in wild places because of their invasive nature[200]. Seed contains 50 - 66% of a fatty oil[74]. No more details given.

dwatta Acrid Alternative Anodyne Antispasmodic Cancer Chologogue Diaphoretic Diuretic Hydrogogue Narcotic Ophthalmic Purgative Stomachic WartsGreater celandine has a long history of herbal use[4]. Traditionally it was employed as an ophthalmic to treat and clear the eyesight whilst in modern herbal medicine it is used more as a mild sedative, antispasmodic and detoxifying herb, relaxing the muscles of the bronchial tubes, intestines and other organs[254]. The latex is much used externally to treat warts. Caution should be employed, especially when the plant is used internally however, because it contains toxic alkaloids[7, 21]. The leaves and the sap are acrid, alternative, anodyne, anti-spasmodic, caustic, chologogue, diaphoretic, diuretic, hydrogogue, narcotic, purgative[4, 7, 9, 21, 46, 165, 238]. They are used in the treatment of bronchitis, whooping cough, asthma, jaundice, gallstones and gallbladder pains[254]. The plant is harvested in the spring as it comes into flower; it is best used fresh[7], but can also be dried for later use[9]. The roots can also be used, these are harvested in the autumn and dried for later use[9]. The plant has anticancer properties and is analgesic[4, 218]. It is an important component of a stomach ulcer drug[218]. The plant has an abundant acrid bright-orange sap that stains the skin strongly and is powerfully irritant[4]. It is used as an external treatment to get rid of warts, ringworm and corns[13, 187, 222, 244] and has also been used to remove films from the cornea of the eye[4]. The plant contains the alkaloid chelidinine, which is similar to the alkaloid papaverine found in poppies. This alkaloid has antispasmodic and sedative effects on the bile ducts and bronchi. However, results have been inconsistent, especially if the preparation is not fresh[244]. The plant also contains the alkaloid sparteine, which restores normal rhythm to feeble arrhythmic myocardia[207]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve *Chelidonium majus* for liver and gallbladder complaints (see [302] for critics of commission E).

nrakta Most of Europe, including Britain, east to N. Asia. ksacta Rubble, damp ground, banks, hedgerows and by walls[7, 17], nearly always close to human habitations[4].

propta Seed - sow in situ February to May or August to November. Germination usually takes place within 1 - 12 months[164, 200]. The plant self-sows freely and should not need much encouragement. Division in March[111]. The plant bleeds profusely so this method is not recommended[200].

nwatta Landscape Uses:Woodland garden. Succeeds in any soil other than boggy conditions[1, 111, 233]. Prefers a rich soil of a woodland nature[1, 31]. Shade tolerant[31]. Plants grow well on walls if they are given a semi-shaded position and a pocket of soil into which to root[219]. A short-lived perennial[187], but it self-sows freely and can easily become a weed[200]. It quickly colonizes waste ground and thin woodland areas[233]. Once established, the plant is very difficult to eradicate. Special Features: North American native, Naturalizing, Attractive flowers or blooms.

6.2.405 Clematis brachyura

5 tlin 9 cyuc 1 kcaak 0 tcan 0 dwat 1 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikli-wisslip hpa7tmwatli xre7t hjonli

drutta Clematis brachyura is a deciduous Climber growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no reports of toxicity have been seen for this species, some if not all members of this genus are mildly poisonous. The toxic principle is dissipated by heat or by drying[65].

kcakta Edible Parts: LeavesEdible Uses: Young leaves - cooked[177]. Some caution is advised, see the notes above

6.2.313 Physalis alkekengi franchetii

Winter Cherry
5 tlin 9 cyuc 2 kcaak 0 tcan 2 dwat 0.5 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Physalis alkekengi franchetii is a PERENNIAL growing to 0.5 m (1ft 8in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All parts of the plant, except the ripe fruit, are poisonous[19, 65, 238].

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit - raw or cooked[1, 2, 4, 7, 105]. The plant conveniently wraps up each fruit in its own 'paper bag' (botanically, the calyx) to protect it from pests and the elements. This calyx is toxic and should not be eaten[34, 65]. Rich in vitamins[100], with twice the vitamin C of lemons[179], but not much taste[178]. We have found them to be bitter and rather unpleasant[K]. Young leaves - cooked[105, 170, 179]. Caution is advised, the leaves are almost certainly poisonous, at least when raw.

tcanta Plants spread rapidly by their roots and can be grown as a ground cover[208]. They are best spaced about 1 metre apart each way[208].

dwatta Aperient Diuretic Expectorant Febrifuge Malaria Vitamin CThe plant has a long history of herbal use, and an interesting chemistry, but it is seldom used in modern practice[238]. The whole plant is antiphlogistic, antipyretic, antitussive and expectorant[9, 61, 147, 178, 218]. An overdose of the plant is said to easily precipitate an abortion[218]. The fruit is aperient, strongly diuretic and lithontriptic[4, 7, 9, 218]. It is used internally in the treatment of gravel, suppression of urine etc and is highly recommended in fevers and in gout[4, 238]. The fruit is harvested when fully ripe and can be used fresh, juiced or dried[238]. The calyx should be removed[238]. The leaves and stems are febrifuge and slightly tonic[4]. They are used in the treatment of the malaise that follows malaria, and for weak or anaemic people[4]. The fresh leaves have been used externally in the treatment of skin inflammations[238]. The seed is used to promote early labour[218]. A homeopathic remedy is made from the fruit. It is used in the treatment of kidney and bladder disorders[9].

nrakta Asia - Caucasus to China. Occasionally naturalized in Britain. ksacta Cultivated ground and vineyards[147].

propta Seed - sow March/April in a greenhouse only just covering the seed. Germination usually takes place quickly and freely. Prick out the seedlings into individual pots of fairly rich soil when they are large enough to handle and plant them out in early summer. Diurnal temperature fluctuations assist germination[170]. Division in spring[111]. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer. Basal cuttings in early summer[111]. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Succeeds in any well-drained soil in full sun or light shade[111, 200]. The fully dormant plant is hardy in most of Britain, though the young growth in spring can be damaged by late frosts. A very ornamental plant[1] though it can be invasive[200]. This sub-species, which is sometimes treated as a separate species, is a more vigorous form of *P. alkekengi* with larger fruits[200]. Slugs are very fond of the new growth in spring and can destroy even quite large clumps[K].

6.2.314 Sedum spectabile

Ice Plant
5 tlin 9 cyuc 2 kcaak 3 tcan 1 dwat 0.4 m hkuc
htut cyutli hgatkycutcup hwicli hyishrasjlutnyik hpa7tli flat-prikliwis hpa7tmwatli fyfxre7t hjonli

drutta Sedum spectabile is a PERENNIAL growing to 0.4 m (1ft 4in) by 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from September to October, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked[105]. The leaves are very mucilaginous but have a fairly bland flavour[K].

tcanta Plants can be grown as a ground cover when planted about 30cm apart each way[208].

dwatta Antiphlogistic Depurative SialagogueThe plant is antiphlogistic, depurative, sialagogue[147].

nrakta E. Asia - China, Korea, Manchuria. ksacta Valleys, rocky cliffs and damp places along woodlands[147].

propta Seed - surface sow in spring in well-drained soil in a sunny position in a greenhouse. Do not allow the soil to dry out. Prick out the seedlings into individual pots when they are large enough to handle. If sufficient growth is made, it is possible to plant them out during the summer, otherwise keep them in a cold-frame or greenhouse for their first winter and plant them out in early summer of the following year[K]. Division is very easy and can be carried out at almost any time in the growing season, though is probably best done in spring or early summer. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer. Cuttings at almost any time in the growing season. Very easy, even a single leaf will produce roots and form a new plant.

nwatta A very easily grown and tolerant plant, it succeeds in most soils[188] but prefers a fertile well-drained soil in a sunny position[200]. Tolerates poor soils[233]. Established plants are drought tolerant[200], they can also tolerate considerable neglect, surviving even in the dense growth of weeds[K]. Plants are hardy to about -20°c[187]. This species has pink flowers[200]. All members of this genus are said to have edible leaves, though those species that have yellow flowers can cause stomach upsets if they are eaten in quantity[62, 85]. The flowers have a honey-like smell similar to Buddleias[245]. A very ornamental plant[1], there are some named varieties[187]. The flowers are very attractive to bees and lepidoptera[30]. Plants in this genus seem to be immune to the predations of rabbits[233]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fleshy. Thick or swollen - fibrous or tap root [2-1].

6.2.315 Cardamine kitaibelii

5 tlin 9 cyuc 2 kcaak 0 tcan 0 dwat 0.2 m hkuc
hmimhtut cyutli tcupha7n hwicli hrasjlutnyik hpa7tli flat-prikliwis hpa7tmwatli fyfxre7t hjonli

drutta Cardamine kitaibelii is a PERENNIAL growing to 0.2 m (0ft 8in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: Flowers LeavesEdible Uses: Leaves - raw or cooked[K]. A mild cabbage flavour with a hint of cress[K]. Flowers - raw[K]. A mild cabbage flavour with a hint of cress[K].

nrakta Europe - southern Switzerland, northern Italy and Yugoslavia. ksacta Not known

propta Seed - sow spring in a cold frame. Germination usually takes place within 1 - 3 weeks at 15°c[175]. When

large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in a greenhouse or cold frame for the first two years, planting them out when dormant in late summer. Division in early spring or after the plant dies down in the summer. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Prefers a moist humus rich soil in shade or semi-shade[200] but succeeds in most soils that are not dry[1]. This species was seen growing and thriving in well-drained soil in a lightly shaded position at Kew[K].

6.2.316 Dendranthema indicum

Chrysanthemum

5 tlin 9 cyuc 2 kcak 0 tcan 3 dwat 0.6 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Dendranthema indicum is a PERENNIAL growing to 0.6 m (2ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Flowers Leaves Oil SeedEdible Uses: Oil TeaThe flower heads are pickled in vinegar[46, 61, 177, 183]. Young leaves - cooked[105, 177, 183]. An aromatic tea is made from the leaves[183]. Seed[183]. No more details are given but it is very small and would be rather fiddly to use.

tcanta OilThe seed contains about 16% of a semi-drying oil, but no information is given as to its uses[240, 283]. The seed is rather small, commercial extraction is probably not viable[K].

dwatta Antiphlogistic Aperient Bitter Blood tonic Depurative Eczema Febrifuge Ophthalmic Stomachic VD VulneraryThe whole plant is antiphlogistic, blood tonic, depurative, febrifuge and vulnerary[147, 174, 178]. The plant is used in China to treat eye ailments[218]. In conjunction with black pepper it is used in the treatment of gonorrhoea[240]. The leaves are depurative[240]. They are used in China in the treatment of migraine[240]. The flowers are aperient, bitter, hypotensive, stomachic and vasodilator[176, 240]. They contain the glycoside chrysanthemin that yields glucose and cyanidin on hydrolysis, together with stachydrine and an essential oil[283]. They have an antibacterial action, inhibiting the growth of *Staphylococcus*, *E. coli*, *streptococcus*, *C. diphtheriae*, *Bacillus dysenteriae*[176]. The flowers are used in the treatment of furuncle, scrofula, deep-rooted boils, inflammation of the throat, eyes and cervix, eczema, itchiness of the skin and hypertension[176]. They have a rejuvenating effect when used over a long period of time[283]. An essential oil obtained from the plant contains chrysanthenone, this is active on the brain centre affected by Parkinson's disease[240].

nrakta E. Asia - Eastern China, Central and Southern Japan. ksacta Found wild in most habitats[147]. Grasslands on mountain slopes, thickets, wet places by rivers, fields, roadsides, saline places by seashores, under shrubs 100 - 2900 m. Nearly throughout China[266].

propta Seed - sow spring to early summer in a greenhouse and only just cover the seed[200]. It usually germinates in 10 - 18 days at 15°c but if it does not germinate within 4 weeks then try chilling the seed for 3 weeks in the salad compartment of a fridge[164]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Succeeds in most well-drained fertile soils in a sunny position[1, 200]. Plants tolerate temperatures down to about -10°c and should succeed outdoors in most parts of Britain[260]. This species is closely related to *D. x grandiflorum* (the cultivated chrysanthemum) according to one

report[58] whilst another says that it is a parent of the cultivated chrysanthemum[1]. It has been proposed (1999) to restore this species to *Chrysanthemum* as *C. indicum* L. since the plant is so widely known under this name. When bruised, the foliage has a pungent refreshing fragrance that is somewhat lemon-like and reminiscent of chamomile[245].

6.2.317 Samolus valerandi

Brookweed, Seaside brookweed

5 tlin 9 cyuc 2 kcak 0 tcan 1 dwat 0.3 m hkuc htut cyutli tcuphja7nhs6s hwicli hrasjlutnyik hpa7tli priklwis hpa7tmwatli fyfjxre7t hjonli

drutta Samolus valerandi is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to August, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist or wet soil and can grow in water. The plant can tolerate maritime exposure.

kcakta Edible Parts: LeavesEdible Uses: Young leaves - raw or cooked[46, 61]. A rather bitter flavour[K].

dwatta AntiscorbuticThe leaves are antiscorbutic[46, 61].

nrakta Most regions of the world, including Britain, usually near the sea. ksacta Wet places, especially near the sea[17], also in shallow water, avoiding acid soils and shade[56].

propta Seed - surface sow in a cold frame in the spring, standing the pot in about 3cm of water. Prick out the seedlings when they are large enough to handle and gradually increase the depth of water as the plants grow until it is level with the tops of the pots. Plant out in the summer if there has been sufficient growth, otherwise plant out in late spring of the following year. Division in spring.

nwatta Succeeds in ordinary garden soil in a wet position or in shallow water[1, 200]. Dislikes shade or acid soils.

6.2.318 Anacamptis pyramidalis

Pyramidal Orchid

5 tlin 9 cyuc 2 kcak 0 tcan 1 dwat 0.3 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli prikwlisslip hpa7tmwatli xre7t hjonli

drutta Anacamptis pyramidalis is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from April to June, and the seeds ripen in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Lepidoptera (Moths and Butterflies). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: RootEdible Uses: DrinkTuber - cooked[2, 4, 61]. It is a source of 'salep', a fine white to yellowish-white powder that is obtained by drying the tuber and grinding it into a powder[2, 105, 177]. Salep is a starch-like substance with a sweetish taste and a faint somewhat unpleasant smell[4]. It is said to be very nutritious and is made into a drink or can be added to cereals and used in making bread etc[5, 100, 183]. One ounce of salep is said to be enough to sustain a person for a day[100, 115].

dwatta Demulcent NutritiveSalep (see above for more details) is very nutritive and demulcent[4]. It has been used as a diet of special value for children and convalescents, being boiled with water, flavoured and prepared in the same way as arrowroot[4]. Rich in mucilage, it forms a soothing and demulcent jelly that is used in the treatment of irritations of the gastro-intestinal canal[4]. One part of salep to fifty parts of water is sufficient to make a jelly[4]. The tuber, from which salep is prepared, should be harvested as the plant dies down after flowering and setting seed[4].

nrakta Most of Europe, including Britain, south and east to N. Africa and W. Asia. ksacta Grassland, on chalk or limestone and on calcareous dunes[17], mainly in the southern part of Britain[245].

propta Seed - best sown as soon as it is ripe in a cold frame[111]. The seed can be stratified and sown in spring but will then be slow to germinate[133]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer. Division - best done in spring but it can also be done in autumn[1, 111]. Another report says that division is best carried out in the autumn or late winter because the plants come into growth very early in the year[233].

nwatta Thrives in most soils and in the light shade of trees[1]. Grows well in heavy clay soils. Prefers a moist soil in sun or semi-shade[200]. Prefers a calcareous soil. Grows well in open woodlands[1, 4]. Members of this genus seem to be immune to the predations of rabbits and deer[233]. A greedy plant, inhibiting the growth of nearby species, especially legumes[54]. Considered to be a part of *A. napellus* by most botanists[1], it is probably *A. napellus vulgare*. (Rchb.)Rouy. and Foucaud[200]. We are keeping this record separate because the suggestion that this species is not poisonous[178] requires investigation.

6.2.400 Phalaris minor

Small Canary Grass, Littleseed canarygrass

5 tlin 9 cyuc 1 kcak 0 tcan 0 dwat m hkuc htut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Phalaris minor is a ANNUAL growing to 1.2 m (4ft) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf from May to October, in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist or wet soil.

kcakta Seed - cooked[257]. The seed can be ground into a flour and used in making bread, cakes etc. It is rather small and fiddly to utilize.

nrakta Europe - Mediterranean to northwest France. Naturalized, or perhaps native, in the Channel Islands. ksacta Sandy soils[17].

propta Seed - sow spring in situ[162].

nwatta An easily grown plant, succeeding in an ordinary garden soil[1]. It is tolerant of most conditions, dry or wet[200].

6.2.401 Berberis soulieana

5 tlin 9 cyuc 1 kcak 0 tcan 2 dwat 1.5 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyfjxre7t hjonli

drutta Berberis soulieana is an evergreen Shrub growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year; in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked.

tcanta DyeA good informal hedging plant[200]. A yellow dye is obtained from the roots.

dwatta Antibacterial Cancer DysenteryBerberine, universally present in rhizomes of Berberis species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Licorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta E. Asia - China. ksacta Not known

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification

and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78].

nwatta Prefers a warm moist loamy soil and light shade but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. Hybridizes freely with other members of this genus[1]. Plants can be pruned back quite severely and resprout well from the base[200].

6.2.402 Thalictrum aquilegifolium

5 tlin 9 cyuc 1 kcak 0 tcan 1 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Thalictrum aquilegifolium is a PERENNIAL growing to 1 m (3ft 3in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to July, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects, wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The whole plant is poisonous, particularly the root[13].

kcakta Edible Parts: Leaves RootEdible Uses: Root - raw or roasted[22, 46, 61]. Caution is advised, there is one report that suggests that the root is particularly poisonous[13]. Young leaves - cooked[105]. Caution is advised, they are possibly poisonous.

dwatta CytostaticCytostatic[65].

nrakta E. and C. Europe to Asia. ksacta Damp woods, hedges and rich upland meadows of the lower Alps, often in stony places near glaciers[13].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame[K]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. The seed can also be sown in an outdoor seedbed in spring[111]. Plant them into their permanent positions the following spring. Division in spring as new growth commences or in the autumn[111]. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring.

nwatta Succeeds in most fairly good soils in sun or semi-shade[1, 111]. Prefers a humus rich soil[111]. A very ornamental plant[1], it is hardy to about -25°c[187]. Grows well on a woodland edge[188]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54]. Members of this genus are rarely if ever troubled by browsing deer[233].

6.2.403 Panax pseudoginseng

Ginseng, Japanese ginseng

5 tlin 9 cyuc 1 kcak 0 tcan 3 dwat 1 m hkuc pcmimhim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Panax pseudoginseng is a PERENNIAL growing to 1 m (3ft 3in) by 0.7 m (2ft 4in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

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

kcakta Edible Parts: RootEdible Uses: Root - cooked[61].

nrakta A hybrid of garden origin, *P. atrosanguinea* x *P. argyrophylla*. ksacta Not known in the wild.

propta Seed - sow early spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. This is a hybrid species and it will not come true from seed. Division in spring. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta An easily grown plant, succeeding in a well-drained loam, preferring a position in full sun but tolerating shade[1]. It prefers an alkaline soil but tolerates a slightly acid soil[200]. Members of this genus are rarely if ever troubled by browsing deer[233].

6.2.396 Aster yomena

5 tlin 9 cyuc 1 kcaak 0 tcan 0 dwat 1.5 m hkuc
htuc cyutli tcup hwicli hrasjltunyk hpa7tli flatprikliwis hpa7tmwatli fyfxre7t hjonli

drutta *Aster yomena* is a PERENNIAL growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from August to October, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves and young plants - cooked[105, 116, 177].

nrakta E. Asia - Japan ksacta Lowlands, where the soil is moist, especially paddy fields, C. and S. Japan[58].

propta Seed - surface sow in spring in a cold frame. Do not allow the compost to become dry. Pre-chilling the seed for two weeks can improve germination rates[134]. Germination usually takes place within 2 weeks at 20°C[134]. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn[200]. Very easy, larger divisions can be planted straight into their permanent positions whilst smaller clumps are best potted up and kept in a cold frame until they are growing away well.

nwatta We have very little information on this species and do not know if it will be hardy in Britain, though judging by its native range it should succeed outdoors in many parts of this country. The following notes are based on the general needs of the genus. Succeeds in most good garden soils[1], preferring one that is well-drained and moisture retentive[200]. Prefers a sunny position[200]. Most species in this genus seem to be immune to the predations of rabbits[233]. Hybridizes freely with other members of this genus[200].

6.2.397 Kalimeris pinnatifida

Japanese Aster

5 tlin 8 cyuc 1 kcaak 0 tcan 0 dwat 1.5 m hkuc
hmimhtut cyutli tcup hwicli hrasjltunyk hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Kalimeris pinnatifida* is a PERENNIAL growing to 1.5 m (5ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves and young plants - cooked[1, 46, 61, 105, 177].

nrakta E. Asia - China, Japan. ksacta Hills and low mountains in C. Japan[58].

propta Seed - sow spring in a greenhouse and only just cover. Keep the compost moist. The seed usually germinates in 2 - 3 weeks at 15°C[138]. Grow on in cool conditions, about 10°C[138]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring. This should be done at least every 3 years in order to maintain the vigour of the plant.

nwatta Landscape Uses:Border, Container, Massing, Specimen. Prefers a moist loamy soil[138] though it succeeds in most soils[1]. Cultivated as a vegetable in Japan[46].

6.2.398 Spiraea pyramidata

Spirea

5 tlin 9 cyuc 1 kcaak 0 tcan 1 dwat 1 m hkuc
hmimhtut cyutli tcup hwicli hrasjltunyk hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Spiraea pyramidata* is a deciduous Shrub growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Edible Uses: TeaA tea is made by boiling the stems, leaves and flowers[161, 183, 257].

dwatta TonicA decoction of the plant has been drunk as a tonic[257].

nrakta Western N. America - British Columbia to Oregon. ksacta Streambanks and moist to dry slopes[204].

propta Seed - we have no information for this species but suggest sowing the seed as soon as it is ripe in a cold frame if possible. It is likely to require stratification before it germinates, so stored seed should be sown in a cold frame as early in the year as you receive it. Prick out the seedlings into individual pots when they are large enough to handle, and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a light sandy soil a frame. Cuttings of mature wood of the current seasons growth, 15cm long, October/November in an outdoor frame[200]. Another report says that September is a good time to do this[11]. Division of suckers in early spring[200]. They can be planted out straight into their permanent positions.

nwatta An easily grown plant, it tolerates most soils[200], but prefers a good loamy soil, abundant moisture and full sunlight[11, 200]. This species is probably a natural hybrid, *S. betulifolia* x *S. douglasii menziesii*[11, 204]. It hybridizes freely with other members of this genus[11].

6.2.399 Aconitum multifidum

5 tlin 9 cyuc 1 kcaak 0 tcan 0 dwat m hkuc
hmimhtut cyutli tcup hwicli hrasjltunykfrp hpa7tli flatprikliwis hpa7tmwatli hjonli

drutta *Aconitum multifidum* is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. The flowers are pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The whole plant is highly toxic - simple skin contact has caused numbness in some people[1, 200].

kcakta Edible Parts: LeavesEdible Uses: Leaves[178]. No further details are given, apart from a claim that this species is not poisonous - a report that should be treated with extreme caution.

nrakta Europe - W. Alps and the Pyrenees. ksacta Not known

propta Seed - surface sow, preferably as soon as it is ripe, in the greenhouse and do not allow the compost to dry out. The seed of this species is extremely simple, it has a minute embryo surrounded by a single layer of protective cells. It contains very little food reserves and depends upon a symbiotic relationship with a species of soil-dwelling fungus. The fungal hyphae invade the seed and enter the cells of the embryo. The orchid soon begins to digest the fungal tissue and this acts as a food supply for the plant until it is able to obtain nutrients from decaying material in the soil[200]. It is best to use some of the soil that is growing around established plants in order to introduce the fungus, or to sow the seed around a plant of the same species and allow the seedlings to grow on until they are large enough to move. Division of the tubers as the flowers fade[230]. This species produces a new tuber towards the end of its growing season. If this is removed from the plant as its flowers are fading, the shock to the plant can stimulate new tubers to be formed. The tuber should be treated as being dormant, whilst the remaining plant should be encouraged to continue in growth in order to give it time to produce new tubers[230]. Division can also be carried out when the plant has a fully developed rosette of leaves but before it comes into flower[230]. The entire new growth is removed from the old tuber from which it has arisen and is potted up, the cut being made towards the bottom of the stem but leaving one or two roots still attached to the old tuber. This can often be done without digging up the plant. The old tuber should develop one or two new growths, whilst the new rosette should continue in growth and flower normally[230].

nwatta Requires a deep rich soil[1, 135]. Prefers a hot well-drained bank[42], growing well in a sunny dry border or on a screed[230]. Orchids are, in general, shallow-rooting plants of well-drained low-fertility soils. Their symbiotic relationship with a fungus in the soil allows them to obtain sufficient nutrients and be able to compete successfully with other plants. They are very sensitive to the addition of fertilizers or fungicides since these can harm the symbiotic fungus and thus kill the orchid[230]. Plants can be grown in lawns in calcareous soils, they should not be cut down until the leaves are dying down in the summer[230]. During the day the flowers have a pronounced aroma of vanilla in order to attract pollinating butterflies. In the evening, when damp with dew, the smell is more goat-like and this acts as a repellent to moths[245].

6.2.319 Ophrys sphegodes

Early Spider Orchid

5 tlin 9 cyuc 2 kcaak 0 tcan 2 dwat 0.5 m hkuc
hmimhtut cyutli tcup hwicli hrasjltunyk hpa7tli flatprikliwisslip hpa7tmwatli xre7t hjonli

drutta *Ophrys sphegodes* is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Root - cooked. It is a source of 'salep', a fine white to yellowish-white powder that is obtained by drying the tuber and grinding it into a powder[200]. Salep is said to be very nutritious and is made into a drink or added to other cereals and used in bread etc[183]. One ounce of salep is said to be enough to sustain a person for a day[100, 115]. The salep can also be made into a drink[100].

dwatta Demulcent NutritiveSalep (see above for more details) is very nutritive and demulcent[4]. It has been used as a diet of special value for children and convalescents, being boiled with water, flavoured and prepared in the same way as arrowroot[4]. Rich in mucilage, it forms a soothing and demulcent jelly that is used in the treatment of irritations of the gastro-intestinal canal[4]. One part of salep to fifty parts of water is sufficient to make a jelly[4]. The tuber, from which salep is prepared, should be harvested as the plant dies down after flowering and setting seed[4].

nrakta Central and southern Europe, including Britain, to N. Africa. ksacta Grassy slopes, banks and field borders

on chalk or limestone[17].

propta Seed - surface sow, preferably as soon as it is ripe, in the greenhouse and do not allow the compost to dry out. The seed of this species is extremely simple, it has a minute embryo surrounded by a single layer of protective cells. It contains very little food reserves and depends upon a symbiotic relationship with a species of soil-dwelling fungus. The fungal hyphae invade the seed and enter the cells of the embryo. The orchid soon begins to digest the fungal tissue and this acts as a food supply for the plant until it is able to obtain nutrients from decaying material in the soil[200]. It is best to use some of the soil that is growing around established plants in order to introduce the fungus, or to sow the seed around a plant of the same species and allow the seedlings to grow on until they are large enough to move. This species only rarely forms new offsets and so division is seldom feasible, the following methods can be tried, however[230]. Division of the tubers as the flowers fade[230]. This species produces a new tuber towards the end of its growing season. If this is removed from the plant as its flowers are fading, the shock to the plant can stimulate new tubers to be formed. The tuber should be treated as being dormant, whilst the remaining plant should be encouraged to continue in growth in order to give it time to produce new tubers[230]. Division can also be carried out when the plant has a fully developed rosette of leaves but before it comes into flower[230]. The entire new growth is removed from the old tuber from which it has arisen and is potted up, the cut being made towards the bottom of the stem but leaving one or two roots still attached to the old tuber. This can often be done without digging up the plant. The old tuber should develop one or two new growths, whilst the new rosette should continue in growth and flower normally[230].

nwatta Plants can be grown in a lawn, but the lawn must not be cut until the plants have set seed[200]. Plants prefer a shady position[188]. Orchids are, in general, shallow-rooting plants of well-drained low-fertility soils. Their symbiotic relationship with a fungus in the soil allows them to obtain sufficient nutrients and be able to compete successfully with other plants. They are very sensitive to the addition of fertilizers or fungicides since these can harm the symbiotic fungus and thus kill the orchid[230]. This symbiotic relationship makes them very difficult to cultivate, though they will sometimes appear uninvited in a garden and will then thrive. Transplanting can damage the relationship and plants might also thrive for a few years and then disappear, suggesting that they might be short-lived perennials[230]. The flowers resemble a female insect and also emit a scent similar to female pheromones, they are pollinated by a male insect of that species attempting to copulate with the flower[200]. Plants are rather sparingly visited by bees, setting seed only if visited[17]. Tubers should be planted out whilst they are dormant, this is probably best done in the autumn[200]. They should be planted at least 5cm below soil level[200].

6.2.320 Bidens tripartita

Burr Marigold, Threelobe beggarticks
5 tlin 9 cyuc 2 kcaak 0 tcan 2 dwat 0.6 m hkuc
htuc cyutli tcuphja7n hwicli hrasjltunyk hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Bidens tripartita* is a ANNUAL growing to 0.6 m (2ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, hover-flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist or wet soil.

kcakta Edible Parts: LeavesEdible Uses: Young leaves - cooked[105, 177, 183].

tcanta Dye RepellentYields a black dye[178]. The part of the plant that is used is not specified. The burning herb repels insects and flies[268]. The flowers yield a yellow dye of indifferent quality when alum is used as a mordant[4, 115, 268].

dwatta Antiseptic Aperient Astringent Diuretic Emmenagogue Febrifuge Narcotic Sedative StypticBurr marigold is little used as a medicine nowadays, but it was once esteemed for its styptic properties being used to quickly staunch blood

flow - it was often used to treat uterine haemorrhage and conditions producing blood in the urine[254]. The whole plant is antiseptic, aperient, astringent, diuretic, emmenagogue, febrifuge, narcotic, sedative, styptic and sudorific[4, 61, 165, 218]. It is an excellent remedy for ruptured blood vessels and bleeding of any kind, and is of benefit to people with consumption[4]. It is used internally to treat bladder and kidney problems, blood in the urine, uterine bleeding, ulcerative colitis and peptic ulcers[238, 254]. Externally, it is used in the treatment of alopecia[238]. It is usually combined with a carminative herb such as ginger when used to treat digestive tract ailments[254]. The plant is harvested as it comes into flower and is dried for later use[238].

nrakta Most of Europe, including Britain, north to 63°, east to W. Asia. ksacta Ditches, pond and lake margins, sides of streams etc[17].

propta Seed - sow in situ during early spring and only just cover the seed. So long as the soil does not dry out, the seed usually germinates in 2 - 3 weeks at 15°c[134].

nwatta Succeeds in any moderately fertile damp to wet soil in full sun[200, 238]. The flowering heads smell like rosin or cedar when they are burnt[4]. The seed coats have reflexed prickles which allow them to adhere to clothing, animal fur etc[4]. When growing on the edge a pond, these seeds have been known to kill goldfish by adhering to their gills[4].

6.2.321 *Mentha satuireoides*

Native Pennyroyal

5 tlin 9 cyuc 2 kcaak 0 tcan 2 dwat 0.3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Mentha satuireoides* is a PERENNIAL growing to 0.3 m (1ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

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

kcakta Edible Parts: LeavesEdible Uses: Condiment TeaLeaves - raw or cooked. Used as a flavouring in salads or cooked foods. A herb tea is made from the leaves.

tcanta Essential Repellent StrewingAn essential oil is obtained from the whole plant. It has a scent intermediate between pennyroyal and peppermint[238]. The plant is used as an insect repellent[154]. Rats and mice intensely dislike the smell of mint. The plant was therefore used in homes as a strewing herb and has also been spread in granaries to keep the rodents off the grain[244].

dwatta Abortifacient Alternative Antiseptic Antispasmodic Blood purifier Carminative Digestive Emmenagogue TonicThe leaves and flowering plant are alternative, antispasmodic, blood purifier, digestive, emmenagogue and tonic[152, 154, 238]. A tea made from the leaves has traditionally been used in the treatment of fevers, coughs, colds, headaches, digestive disorders, menstrual complaints and various minor ailments[152, 222, 238]. It can be used as a substitute for both pennyroyal (*Mentha pulegium*) and peppermint (*Mentha x piperita*)[238]. Like those species, it should not be prescribed for pregnant women since it can procure an abortion[238]. The leaves are harvested as the plant comes into flower and can be dried for later use[238]. The essential oil in the leaves is antiseptic, though it is toxic in large doses[222] and can cause abortions[152, 154].

nrakta Australia - New South Wales, Queensland, Victoria. ksacta Banks of rivers and creeks, open forests and pastures, especially on shale[152].

propta Seed - sow spring in a cold frame. Germination is usually fairly quick. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. *Mentha* species are very prone to hybridisation and so the seed cannot be relied on to breed true. Even without hybridisation, seedlings will not be uniform and

so the content of medicinal oils etc will vary. When growing plants with a particular aroma it is best to propagate them by division[K]. Division can be easily carried out at almost any time of the year, though it is probably best done in the spring or autumn to allow the plant to establish more quickly. Virtually any part of the root is capable of growing into a new plant. Larger divisions can be planted out direct into their permanent positions. However, for maximum increase it is possible to divide the roots up into sections no more than 3cm long and pot these up in light shade in a cold frame. They will quickly become established and can be planted out in the summer.

nwatta Succeeds in most soils and situations so long as the soil is not too dry[1, 16, 200]. Prefers a slightly acid soil[16]. Grows well in heavy clay soils. A sunny position is best for production of essential oils, but it also succeeds in partial shade. Plants are hardy to about -15°c[238]. Most mints have fairly aggressive spreading roots and, unless you have the space to let them roam, they need to be restrained by some means such as planting them in containers that are buried in the soil[K]. Hybridizes freely with other members of this genus. The whole plant has a mint-like aroma. The flowers are very attractive to bees and butterflies[24]. A good companion plant for growing near cabbages and tomatoes, helping to keep them free of insect pests. Members of this genus are rarely if ever troubled by browsing deer[233].

6.2.322 *Oxalis grandis*

Great Yellow Woodsorrel

5 tlin 7 cyuc 2 kcaak 1 tcan 1 dwat 0.2 m hkuc pcmhmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli hjonli

drutta *Oxalis grandis* is a ANNUAL/PERENNIAL growing to 0.2 m (0ft 8in) by 0.2 m (0ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

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

kcakta Edible Parts: Flowers LeavesEdible Uses: Leaves are tart [1-2]. Leaves - raw or cooked[2, 7, 12, 37]. A delicious lemony flavour, the leaves make a refreshing, thirst-quenching munch and are also added to salads, soups, sauces etc[183]. This leaf should be used in moderation[4, 5, 9, 76], see the notes above on toxicity. Flowers - raw. A decorative addition to salads[K].The plant can be toxic and only small amounts should be eaten. Large quantities may cause trembling, cramps, and staggering as in a grazing animal.

tcanta The juice of the leaves removes iron mould stains from linen[6, 66, 115]. Plants can be grown as a ground cover in woodland or under the shade of shrubs[208].

dwatta Some *Oxalis* species have medicinal properties but no information could be found for this species. For example *Oxalis acetosella*: The fresh or dried leaves are anodyne, antiscorbatic, astringent, diuretic, emmenagogue, expectorant, febrifuge, irritant and stomachic[4, 7, 9, 21]. A decoction is used in the treatment of fevers, both to quench the thirst and allay the fever[4]. Externally, the leaves are crushed and applied locally to dispel boils and abscesses, they also have an astringent affect on wounds[7]. When used internally, some caution is advised due to the oxalic acid content of the leaves[4], the plant is contra-indicated for people suffering from gastritis or a calculus condition[7].

nrakta Native to the eastern United States from Georgia north to Pennsylvania and Wisconsin, west as far as Louisiana. ksacta Sandy woods, alluvial soils; 100-1100 m

propta Seed - best sown as soon as it is ripe in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in late spring

propta Seed - we have no information for this species but suggest sowing the seed as soon as it is ripe in a cold frame if possible. It is likely to require stratification before it germinates, so stored seed should be sown in a cold frame as early in the year as you receive it. Prick out the seedlings into individual pots when they are large enough to handle, and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a light sandy soil a frame. Cuttings of mature wood of the current seasons growth, 15cm long, October/November in an outdoor frame[200]. Another report says that September is a good time to do this[11]. Division of suckers in early spring[200]. They can be planted out straight into their permanent positions.

nwatta Tolerates most soils[200], but prefers a good loamy soil, abundant moisture and full sunlight[11, 200]. Hybridizes freely with other members of this genus[11]. A variable species, it is often confused in gardens with *S. trilobata*[1, 200].

6.2.392 *Lonicera gracilipes glabra*

5 tlin 9 cyuc 1 kcaak 0 tcan 1 dwat 1.8 m hkuc htut cyuti tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Lonicera gracilipes glabra* is a deciduous Shrub growing to 1.8 m (6ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw[105, 177, 179]. It should be eaten with caution because it is possibly cathartic and emetic[179]. The fruit is about 10mm in diameter[200].

dwatta Cathartic EmeticCathartic, emetic[179].

nrakta E. Asia - Japan. ksacta Forests and clearings all over Japan.

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed requires 2 months cold stratification[113] and should be sown as soon as possible in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm with or without a heel, July/August in a frame. Good percentage[78]. Cuttings of mature wood of the current season's growth, 15 - 20cm with or without a heel, November in a cold frame. Good percentage[78]. Layering in autumn[200].

nwatta Grows best in a good moist soil in a sunny position, it does not fruit so well in the shade[200].

6.2.393 *Rhamnus leptophyllus*

5 tlin 9 cyuc 1 kcaak 0 tcan 0 dwat 1.8 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Rhamnus leptophyllus* is a deciduous Shrub growing to 1.8 m (6ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to June, and the seeds ripen from August to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention of toxicity has been found for this species, there is the suggestion that some members of this genus could be mildly poisonous[65].

kcakta Edible Parts: Edible Uses: TeaA tea is made from the leaves[177].

nrakta E. Asia - C. and W. China. ksacta Thickets or forest margins in valleys, along the sides of roads and on slopes at elevations of 1700 - 2600 metres[266].

propta Seed - best sown in the autumn in a cold frame. Stored seed will require 1 - 2 months cold stratification at

about 5° and should be sown as early in the year as possible in a cold frame or outdoor seedbed[200]. Prick out the seedlings into individual pots when they are large enough to handle, and grow them on in the greenhouse or cold frame for their first winter. Plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame[113]. Cuttings of mature wood of the current year's growth, autumn in a frame. Layering in early spring[4].

nwatta Succeeds in any reasonably good soil[11]. Closely related to *R. parvifolius*[109]. The species in this genus are notably resistant to honey fungus[200].

6.2.394 *Philadelphus microphyllus*

Littleleaf Mock Orange

5 tlin 9 cyuc 1 kcaak 0 tcan 0 dwat m hkuc hmimhtut cyuti kyucrup hwicli hyishrasjlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Philadelphus microphyllus* is a deciduous Shrub growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit[105, 161]. Formerly used as food[257]. No more details are given.

tcanta SoapThe leaves are rich in saponins, when crushed and mixed with water they produce a lather that is an effective cleaner, used on the body, clothes etc[169]. You can wash your hands by merely picking a couple of leaves or a bunch of blossom, wetting your hands and then rubbing the plant material vigorously as if it was a bar of soap[K]. This soap is a very gentle cleaner that does not remove the body's natural oils, but does remove dirt. It is not very effective against oil[K].

nrakta Western N. America - Utah and Colorado to California and New Mexico. ksacta Dry rocky places in sunny rocky canyons and piñon-juniper woodland, 1200 - 3000 metres[71, 184].

propta Seed - best if given 1 months cold stratification[113]. Sow February in a light position in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm long side-shoots, July/August in a shaded frame. Plant out in spring. High percentage[78]. Cuttings of mature wood of the current year's growth, 15 - 25cm with a heel, December in a sheltered bed outdoors. Fair to good percentage[78]. Layering in summer. Very easy.

nwatta Easily grown in any moderately fertile preferably dry soil[184], succeeding in thin soils over chalk and tolerating poor soils[200]. Grows well in heavy clay soils. Succeeds in semi-shade but prefers a position in full sun where it will flower more freely[182, 200]. Hardy to about -20°c[184]. Plants grow best in the east and south-east of Britain, they are shy to flower in gardens with cool summers[11]. Plants are very tolerant of pruning, one third of the stems can be cut down to the ground each year in order to promote fresh growth and heavier flowering[202]. A very ornamental plant[1] with aromatic flowers smelling of pineapples[182].

6.2.395 *Potentilla bicolor*

5 tlin 9 cyuc 1 kcaak 0 tcan 0 dwat 1 m hkuc hmimhtut cyuti tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyfkr7t hjonli

drutta *Potentilla bicolor* is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers

up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the summer or following spring.

nwatta Easily grown in a damp to wet soil in full sun or shade[162, 200]. A very aggressive and invasive plant[162, 200]. Members of this genus are rarely if ever troubled by browsing deer[233].

6.2.388 *Lonicera gracilipes*

5 tlin 9 cyuc 1 kcaak 0 tcan 1 dwat 1.8 m hkuc htut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Lonicera gracilipes* is a deciduous Shrub growing to 1.8 m (6ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw[105, 177, 179]. It should be eaten with caution because is possibly cathartic and emetic[179]. The fruit is about 10mm in diameter[200].

dwatta Cathartic EmeticCathartic, emetic[179].

nrakta E. Asia - Japan. ksacta Forests and clearings all over Japan.

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed requires 2 months cold stratification[113] and should be sown as soon as possible in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7-10cm with or without a heel, July/August in a frame. Good percentage[78]. Cuttings of mature wood of the current season's growth, 15-20cm with or without a heel, November in a cold frame. Good percentage[78]. Layering in autumn[200].

nwatta Grows best in a good moist soil in a sunny position, it does not fruit so well in the shade[200].

6.2.389 *Chimonobambusa marmorea*

Kan-Chiku

5 tlin 9 cyuc 1 kcaak 0 tcan 0 dwat m hkuc hmimhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Chimonobambusa marmorea* is an evergreen Bamboo growing to 1.5 m (5ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Seed StemEdible Uses: Young shoots - cooked[177]. Seed - used as a cereal[177]. The seed is neither regularly nor abundantly produced.

tcanta Hedge HedgeThe plant is useful for low screens, clumps and hedges[195, 200].

nrakta E. Asia - C. and S. Japan. ksacta This plant has long been cultivated in Japan and has been introduced elsewhere[266]. Its original habitat is obscure[200].

propta Seed - surface sow as soon as it is ripe in a greenhouse at about 20°C. Do not allow the compost to dry out. Germination usually takes place fairly quickly so long as the seed is of good quality, though it can take 3-6 months. Grow on in a lightly shaded place in the greenhouse until large enough to plant out. Seed is rarely available. Division in spring as new growth commences. Take divisions with at least three canes in the clump, trying to cause as little root disturbance to the main plant as possible. Grow them on in light shade in a greenhouse in pots of a high fertility sandy medium. Mist the foliage regularly until plants are established. Plant them out into their permanent positions when a good root system has developed, which can take a year or more[200]. Basal cane cuttings.

nwatta Prefers a good loamy soil[1]. Succeeds in most soils so long as they do not dry out[200]. Dislikes drought[1]. Prefers a position sheltered from cold north and east winds[1]. Plants are liable to injury by winter cold[11]. They are hardy to about -20°C according to another report[200]. This species is notably resistant to honey fungus[200]. Plants only flower at intervals of many years. When they do come into flower most of the plants energies are directed into producing seed and consequently the plant is severely weakened. They sometimes die after flowering, but if left alone they will usually recover though they will look very poorly for a few years. If fed with artificial NPK fertilizers at this time the plants are more likely to die[122]. A few stems on each plant usually produce flowers in most years without noticeable harm to the plant[11]. Plants spread rapidly by means of underground suckers and are apt to be invasive, especially when they are well established[11, 200]. New canes are produced from late April.

6.2.390 *Matricaria matricarioides*

Pineapple Weed

5 tlin 9 cyuc 1 kcaak 0 tcan 2 dwat m hkuc htut cyutli kyuctcup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Matricaria matricarioides* is a ANNUAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from June to July, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

pcista Some people are allergic to this plant[222].

kcakta Edible Parts: FlowersEdible Uses: TeaFlower heads - raw or cooked[172]. A tasty nibble[172]. The dried flowers are used to make herb teas[172]. They are pineapple scented when steeped in hot water[183].

tcanta RepellentThe plant repels insects[172]. The dried flowers are used as an insect repellent[213].

dwatta Antispasmodic Carminative Galactogogue Sedative Skin VermifugeThe flowering plant is antispasmodic, carminative, galactogogue, sedative, skin and vermifuge[9, 172, 222]. This plant is rarely used medicinally, though it is sometimes employed as a domestic remedy in the treatment of intestinal worms and also as a sedative[9]. The plant is harvested when in flower in the summer and is dried for later use[9]. Some caution is advised since some individuals are allergic to this plant[222].

nrakta N.E. Asia. An introduced and increasing weed in Britain. ksacta Waysides and waste places, especially along tracks, paths and by trampled gateways[17].

propta Seed - sow spring or late summer in situ. Germination should take place within 3 weeks.

nwatta Succeeds in any well-drained soil in a sunny position[200]. The bruised or sun-warmed leaves emit the appealing odour of ripe apples[245].

6.2.391 *Spiraea blumei*

5 tlin 9 cyuc 1 kcaak 0 tcan 0 dwat 1.5 m hkuc hmimhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Spiraea blumei* is a deciduous Shrub growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to June, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Edible Uses: TeaThe leaves are a tea substitute[177, 183].

nrakta E. Asia - China, Japan, Korea. ksacta Thickets and ravines, 600 - 2000 metres in W. Hupeh[109]. Sunny slopes, mixed forests and roadsides at elevations of 500 - 2000 metres[266].

or early summer. Division in spring. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Annual or perennial herb preferring shade to semi-shade and a mesic - moist to slightly dry soil. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2]. Bloom Color: Yellow. Bloom Time: May to Sep.

6.2.323 *Berberis ulcina*

5 tlin 9 cyuc 2 kcaak 0 tcan 2 dwat 0.6 m hkuc hmimhtut cyutli kyuctcup hwicli hyhrasljutnyikfrp hpa7tli flatprikliwis hpa7tmwatli fyfjxre7t hjonli

drutta *Berberis ulcina* is a SHRUB growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to June, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw[272]. tcanta DyeA yellow dye is obtained from the root.

dwatta Antibacterial Cancer Dysentery Ophthalmic StomachicBerberine, universally present in rhizomes of *Berberis* species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with *Glycyrrhiza* species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta E. Asia - northern India, Nepal and Tibet. ksacta Open windy slopes at elevations of 2500 - 3500 metres in Nepal[272].

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78].

nwatta We have very little information on this species and do not know if it will be hardy in Britain, though judging by its native range it should succeed outdoors in many parts of this country. The following notes are based on the general needs of the genus. Prefers a warm moist loamy soil and light shade but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. Plants can be pruned back quite severely, they re-sprout well from the base[200]. Hybridizes freely with other members of this genus[11].

6.2.324 *Arum italicum*

Italian lords and ladies, Italian Arum

5 tlin 9 cyuc 2 kcaak 0 tcan 0 dwat 0.4 m hkuc pcmhmimhtut cyutli kyuctcup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli hjonli

drutta *Arum italicum* is a PERENNIAL growing to 0.4 m (1ft 4in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from April to May. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista The plant contains calcium oxalate crystals. These cause an extremely unpleasant sensation similar to needles being stuck into the mouth and tongue if they are eaten, but they are easily neutralized by thoroughly drying or cooking the plant or by steeping it in water[65].

kcakta Edible Parts: RootEdible Uses: Tuber - cooked and used as a vegetable[2, 177]. An arrowroot can be extracted from the dried root[105]. The root must be thoroughly dried or cooked before being eaten, see the notes above on toxicity.

nrakta Southern Europe, including Britain, to N. Africa. ksacta Stony ground near the sea, hedges and among old walls, often on calcareous soils[17, 90, 200].

propta Seed - best sown in a greenhouse or cold frame as soon as it is ripe[134]. The seed usually germinates in 1 - 6 months at 15°C[134]. Stored seed should be sown in the spring in a greenhouse and can be slow to germinate, sometimes taking a year or more. A period of cold stratification might help to speed up the process. Sow the seed thinly, and allow the seedlings to grow on without disturbance for their first year, giving occasional liquid feeds to ensure that they do not become mineral deficient. When the plants are dormant in the autumn, divide up the small corms, planting 2 - 3 in each pot, and grow them on in light shade in the greenhouse for a further year, planting out when dormant in the autumn. Division of the corms in summer after flowering[200]. Larger corms can be planted out direct into their permanent positions, though it is best to pot up the smaller corms and grow them on for a year in a cold frame before planting them out.

nwatta Landscape Uses:Border, Container, Rock garden, Woodland garden. Prefers a humus rich soil and abundant water in the growing season[1]. Succeeds in sun or dry shade[90], preferring a shady position[4, 17, 31] and growing well in woodland conditions[1]. A polymorphic species[200], the British form has been separated off by some botanists as *A. neglectum*[17]. The leaves appear in the autumn, the plant staying green all winter[1, K]. The inflorescence has the remarkable ability to heat itself above the ambient air temperature to such a degree that it is quite noticeable to the touch[4]. This probably protects the flowers from damage by frost, or allows it to penetrate frozen ground. Members of this genus are rarely if ever troubled by browsing deer[233]. Special Features:Attractive foliage, Naturalizing, All or parts of this plant are poisonous.

6.2.325 *Matthiola incana*

Stock, Tenweeks stock, Gillyflower, Brompton Stock
5 tlin 9 cyuc 2 kcaak 0 tcan 1 dwat 0.6 m hkuc htut cyutli tcup hwicli hrasljutnyik hpa7tli prikliwis hpa7tmwatli fyfjxre7t hjonli

drutta *Matthiola incana* is a ANNUAL/PERENNIAL growing to 0.6 m (2ft) by 0.3 m (1ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from May to July, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Flowers Leaves SeedpodEdible Uses: Flowers - eaten as a vegetable or used as a garnish, especially with sweet desserts[183]. Highly fragrant[183]. Seedpods[105, 183]. Used as a famine food when all else fails[177].

tcanta DyeA dark blue or purple dye is obtained from the flowers[168].

dwatta Antidote Aphrodisiac Bitter Diuretic Expectorant Stimulant Stomachic TonicThe seeds are aphrodisiac, bitter, diuretic, expectorant, stimulant, stomachic and tonic[240]. An infusion has been used in the treatment of cancer and when mixed with wine it has been used as an antidote to poisonous bites[240].

nrakta S. Europe. Possibly native to S. England. ksacta Sea cliffs and as an escape from cultivation, avoiding acid soils[17]. Rocky and sandy places by the sea[260].

propta Seed - sow early spring in a greenhouse[1]. Germination usually takes place within 2 weeks. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. The seed can also be sown outdoors in situ in mid to late spring.

nwatta Landscape Uses:Border, Container, Foundation, Massing. Succeeds in ordinary garden soil[1]. Prefers a fertile neutral or slightly alkaline soil in full sun[200]. Plants grow best in a sandy soil in a warm, sheltered position[260]. A very ornamental plant[1], it is also a good butterfly plant[17]. Plants are usually biennial or short-lived perennials and are normally grown as annuals in the garden[188]. The wild plant is a perennial with an almost shrubby nature. Garden forms have been bred to have annual or biennial characteristics[260]. The flowers have a strong sweet scent[245]. Special Features: Suitable for cut flowers, Fragrant flowers.

6.2.326 Cerastium fontanum

Chickweed, Common mouse-ear chickweed, Big chickweed 5 tlin 10 cyuc 2 kcaak 0 tcan 0 dwat 0.3 m hkuic hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Cerastium fontanum is a ANNUAL/PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from April to June, and the seeds ripen from May to July. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked[177]. Leaves and young stems - cooked[105].

nrakta E. Asia - Himalayas. ksacta Moist shaded situations, 1700 - 2800 metres in Srinagar[145]. A cosmopolitan weed in China, where it grows at elevations up to 4300 metres[266].

propta Seed - we have no information on this species but suggest sowing the seed in spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in the summer. Division in spring might be possible.

nwatta We have very little information on this species and do not know if it will be hardy in Britain, though judging by its native range it should succeed outdoors in many parts of this country. The subspecies C. fontanum grandiflorum is an annual, though subspecies C. fontanum vulgare is a short-lived perennial[266]. It is likely to require a moist soil in light shade.

6.2.327 Ribes ambiguum

5 tlin 9 cyuc 2 kcaak 0 tcan 0 dwat 0.6 m hkuic hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Ribes ambiguum is a deciduous Shrub growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in May, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 177]. An acid flavour[105], they are commonly eaten in areas where they grow wild[2]. A reasonable size, the green fruit can be 12mm in diameter. [2, 266].

nrakta E. Asia - China, Japan. ksacta Most commonly found growing as an epiphyte in moist moss on the branches of trees[11, 58, 182].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. Stored seed requires 3 months cold stratification at 0 - 9°c and should be sown as early in the year as possible[113, 164]. Under normal storage conditions the seed can remain viable for 17 years or more. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter, planting them out in late spring of the following year Cuttings of half-ripe wood, July/August in a frame[113]. Cuttings of mature wood of the current year’s growth, preferably with a heel of the previous year’s growth, November to February in a cold frame or sheltered bed outdoors[78, 200].

nwatta Easily grown in a moisture retentive but well-drained loamy soil of at least moderate quality[11, 200]. Quite tolerant of shade though not fruiting so well in such a position[11]. Prefers a cool sheltered position in a leafy soil[11]. Hardy to about -20°c[200]. Plants can harbour a stage of ‘white pine blister rust’, so they should not be grown in the vicinity of pine trees[155]. Plants in this genus are notably susceptible to honey fungus[200].

6.2.328 Duchesnea indica

Mock Strawberry, Indian strawberry 5 tlin 11 cyuc 2 kcaak 3 tcan 2 dwat 0.1 m hkuic hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyfxxre7t hjonli

drutta Duchesnea indica is an evergreen Perennial growing to 0.1 m (0ft 4in) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf all year, in flower from May to October, and the seeds ripen from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit - raw[105, 177]. Dry and insipid[17]. Certainly rather tasteless, but it is not dry[K]. A flavour somewhat like a water melon according to some people, but this is possibly the product of a strained imagination[K].The fruit contains about 3.4% sugar, 1.5% protein, 1.6% ash[194]. Vitamin C is 6.3mg per 100ml of juice[194]. The fruit is about 10mm in diameter with the appearance and texture of a strawberry but very little flavour[K]. A clump 2.5m² yields about 150g of fruit annually[194]. Leaves - cooked[179].

tcanta A good ground cover plant, spreading quickly[197] by means of runners[214]. It is rather bare in winter though[K] and should not be grown with small plants since it will drown them out[208]. A good cover for bulbous plants[214]. Perennial groundcover for zone 2 firebreaks. The US government has created a system of firebreaks for areas prone to wildfires, these are separated into concentric zones surrounding buildings. Zone 2 is the second away from the house. These low-level groundcovers provide little fuel.

dwatta Anticoagulant Antiphlogistic Antiseptic Depurative Eczema Febrifuge Poulitce Skin Vitamin CThe whole plant is anticoagulant, antiseptic, depurative and febrifuge[147, 178]. It can be used in decoction or the fresh leaves can be crushed and applied externally as a poultice[147]. It is used in the treatment of boils and abscesses, weeping eczema, ringworm, stomatitis, laryngitis, acute tonsillitis, snake and insect bites and traumatic injuries[147]. A decoction of the leaves is used in the treatment of swellings[147, 178, 218]. An infusion of the flowers is used to activate the blood circulation[218]. The fruit is used to cure skin diseases[218]. A decoction of the plant is used as a poultice for abscesses, boils, burns etc[218].

nrakta E. Asia - China, Japan, Himalayas. An occasional garden escape in Britain[17]. ksacta Shady places in woods, grassy slopes, ravines in low mountains, all over Japan[58].

propta Seed - sow spring in a sunny position in a greenhouse. Germination usually takes place within 1 - 6 weeks or more at 15°c. A period of cold stratification may speed up germination. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division of runners in spring or late summer. Very

6.2.385 Spiraea nervosa angustifolia

5 tlin 9 cyuc 1 kcaak 0 tcan 0 dwat 1.5 m hkuic htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Spiraea nervosa angustifolia is a deciduous Shrub growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Edible Uses: TeaThe leaves are used as a tea[177, 183].

nrakta E. Asia - China, Japan. ksacta Thickets and ravines, 300 - 1300 metres in W. Hupeh[109].

propta Seed - we have no information for this species but suggest sowing the seed as soon as it is ripe in a cold frame if possible. It is likely to require stratification before it germinates, so stored seed should be sown in a cold frame as early in the year as you receive it. Prick out the seedlings into individual pots when they are large enough to handle, and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a light sandy soil a frame. Cuttings of mature wood of the current seasons growth, 15cm long, October/November in an outdoor frame[200]. Another report says that September is a good time to do this[11]. Division of suckers in early spring[200]. They can be planted out straight into their permanent positions.

nwatta Tolerates most soils[200], but prefers a good loamy soil, abundant moisture and full sunlight[11, 200]. This species has not proved to be very hardy in Britain, it is often killed back to ground level in harsh winters but usually resprouts from the base[11]. Hybridizes freely with other members of this genus[11].

6.2.386 Tsuga mertensiana

Mountain Hemlock 5 tlin 7 cyuc 1 kcaak 0 tcan 2 dwat m hkuic pcimhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatprikliwis hpa7tmwatli hjonli

drutta Tsuga mertensiana is an evergreen Tree growing to 45 m (147ft) by 10 m (32ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in leaf all year, in flower in April, and the seeds ripen from October to November. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil. It cannot tolerate atmospheric pollution.

kcakta Edible Parts: Inner barkEdible Uses: Tealnner bark - raw or dried, ground into a powder and then used as a thickening in soups etc or mixed with cereals when making bread[161]. It is best used in the spring[172]. An emergency food, it is only used when all else fails[183]. A herbal tea is made from the young leaves and shoot tips[172, 183].

tcanta Dye Hedge Hedge Incense Pot-pourri Resin Tannin WoodThe slightly unripe cones are used in pot-pourri. They retain an attractive scent for several years[200]. Yields a resin similar to Abies balsamea, it is gathered by incisions in the trunk or by boiling the wood[46, 61, 64]. The bark contains 8 - 14% tannin[46, 171]. The inner bark is used according to one report[82]. A brown dye is obtained from the bark[21, 46]. The boughs are steamed or rubbed on furniture and used as a room deodorant and disinfectant[257]. A pitch (called hemlock pitch), is obtained by distillation of the young branches[46]. Tolerant of light trimming, plants can be grown as a tall hedge[29, 81]. Wood - strong[171]. Used for heavy construction[171]. Close-grained, light, soft and weak according to other reports, which go on to say that it is occasionally manufactured into lumber when other wood is not available[82, 229].

dwatta Astringent Diaphoretic Diuretic PoulitceThe bark is astringent, diaphoretic and diuretic[21]. A tea made from the inner bark or twigs is helpful in the treatment of influenza, colds, kidney or bladder problems, and also makes a good enema for treating diarrhoea[21, 257]. It can also be used as a gargle or mouthwash for mouth and throat problems or externally to wash sores and ulcers[21]. The powdered bark can be put into shoes for tender or sweaty feet or for foot odour[21]. A poultice of the chewed leaves has been used to treat burns[257]. The warm gum obtained from the trunks has been used as a dressing on cuts[257].

nrakta Western N. America - Alaska to California. ksacta Exposed ridges and slopes at high altitudes, often to 3000 metres[82]. The best stands are found in sheltered areas with deep moist well-drained soils, high precipitation and long cold winters[229].

propta Seed - it germinates better if given a short cold stratification[80, 113] and so is best sown in a cold frame in autumn to late winter. It can also be sown in early spring, though it might not germinate until after the next winter. If there is sufficient seed, an outdoor sowing can be made in spring[78]. Pot-grown seedlings are best potted up into individual pots once they are large enough to handle - grow them on in a cold frame and plant them out in early summer of the following year. Trees transplant well when they are up to 80cm tall, but they are best put in their final positions when they are about 30 - 45 cm or less tall, this is usually when they are about 5 - 8 years old[200]. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200].

nwatta Landscape Uses:Hedge, Aggressive surface roots possible, Screen, Specimen, Woodland garden. An easily grown plant, it thrives best when growing in a deep well-drained soil in the western parts of Britain where it appreciates the higher rainfall[11]. However, it succeeds in most soils and positions, being especially good on acidic sandy soils[81]. Plants are very shade tolerant when young, but need more sunlight as they grow older[81, 200]. Plants are thin and poor when grown in dry or exposed places[200]. Dislikes atmospheric pollution[82]. A very ornamental plant[11], it is slow growing for the first few years, averaging 30cm a year, but older trees, especially in Scottish lowland sites in areas with cool moist summers, are growing rapidly[185]. Trees live 400 - 500 years in the wild[229]. They commence bearing seeds when about 20 - 30 years old, years of high production alternating with years of low production[229]. Plants in this genus are notably resistant to honey fungus[200]. Special Features:North American native, Inconspicuous flowers or blooms.

6.2.387 Carex riparia

Great Pond Sedge 5 tlin 9 cyuc 1 kcaak 0 tcan 0 dwat 1.5 m hkuic hmimhtut cyutli tucpha7n hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli hjonli

drutta Carex riparia is an evergreen Perennial growing to 1.5 m (5ft) by 2 m (6ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from May to June, and the seeds ripen from July to August. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: Root SeedEdible Uses: Root - cooked[172]. Seed[172]. No further details are given, but the seed is small and fitly to use[K].

tcanta BeddingThe straw is used for bedding[61].

nrakta Much of Europe, excluding the north but including Britain, N. Africa, W. Asia and the Caucasus. ksacta By slow flowing rivers, in ditches and ponds and occasionally on drier ground[17].

propta Seed - sow in situ in the spring in a moist soil in light shade. If seed is in short supply it can be sown in a cold frame and be planted out in the summer. The seed usually germinates in 2 - 6 weeks at 15°c[138]. Division in spring[200]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot

nrakta A bi-generic hybrid of garden origin, Mahonia aquifolia x Berberis sargentii. ksacta Not known in the wild.

propta Seed - best sown as soon as it is ripe in a cold frame[78]. It usually germinates in the spring[K]. 'Green' seed (harvested when the embryo has fully developed but before the seed case has dried) should be sown as soon as it is harvested and germinates within 6 weeks[K]. Stored seed should be sown as soon as possible in late winter or spring. 3 weeks cold stratification will improve its germination, which should take place in 3 - 6 months at 10°C. Prick out the seedlings when they are large enough to handle and grow them on in a cold frame for at least their first winter. Plant them out in late spring or early summer. This species is a bi-generic hybrid and, if seed is produced, it is very unlikely to breed true. Wounded nodal semi-ripe cuttings in late summer or early autumn[200].

nwatta Succeeds in most soils in sun or shade[182, 200]. Prefers a fertile well-drained soil[188]. Plants only flower and fruit after a long warm growing season[200]. Plants are reputedly immune to rust[200].

6.2.382 Senecio nemorensis

5 tlin 9 cyuc 1 kcaak 0 tcan 1 dwat 2 m hkuc hmimhtut cyutli tcup hwicli hyishrasljutnyikfrip hpa7tli flat-prikliwis hpa7tmwattli xre7t hjonli

drutta Senecio nemorensis is a PERENNIAL growing to 2 m (6ft 7in). See above for USDA hardness. It is hardy to UK zone 6. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no mention of toxicity has been seen for this species, it belongs to a genus that contains a number of plants with a cumulative poisonous effect on the liver[65]. Some caution is advised.

kcakta Edible Parts: StemEdible Uses: Young stems - pickled[177]. Some caution is advised, see the notes above on toxicity.

dwatta Hypoglycaemic UrinaryUninary tract infections, gout, rheumatism and stone formation in the urinary tract. Lowers blood sugar. The herb is contraindicated in pregnancy and nursing and children under 12. Recommended only for external use. Do not apply to broken skin [301].

nrakta Europe to W. Asia. ksacta Damp places, 800 - 1800 metres in Turkey[93].

propta Seed - sow spring in a greenhouse and only just cover the seed. Make sure the compost does not dry out. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in early summer if they have grown sufficiently. Otherwise, grow them on in the greenhouse or cold frame for their first winter and plant them out the following year after the last expected frosts. Division in spring[200]. Root cuttings in early spring[200].

nwatta Succeeds in a sunny position in most well-drained moderately fertile soils[200]. The sub-species S. nemorensis fuchsii. (Gmel.)Celak. is the form used for food in Asia[177].

6.2.383 Berberis sherriffii

5 tlin 9 cyuc 1 kcaak 0 tcan 2 dwat 2 m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasljutnyikfrip hpa7tli flatprikliwis hpa7tmwattli fyifxre7t hjonli

drutta Berberis sherriffii is a deciduous Shrub growing to 2 m (6ft 7in). See above for USDA hardness. It is hardy to UK zone 6. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked.

tcanta DyeA yellow dye is obtained from the root.

dwatta Antibacterial Cancer DysenteryBerberine, universally present in rhizomes of Berberis species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Licuorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta E. Asia - Southeast Tibet. ksacta Lower subalpine to montane zone.

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78].

nwatta Prefers a warm moist loamy soil and light shade but it is by no means fastidious, succeeding in thin, dry and shallow soils but disliking waterlogged soils[11, 200]. Grows well in heavy clay soils. Plants can be pruned back quite severely, they resprouts well from the base[200]. Hybridizes freely with other members of this genus[1]. This species is closely related to B. gyalaiaca[11, 200].

6.2.384 Weigela floribunda

Crimson weigela

5 tlin 9 cyuc 1 kcaak 0 tcan 0 dwat 2.5 m hkuc hmimhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwattli xre7t hjonli

drutta Weigela floribunda is a deciduous Shrub growing to 2.5 m (8ft 2in). See above for USDA hardness. It is hardy to UK zone 6. It is in flower from May to June. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. It can tolerate atmospheric pollution.

kcakta Edible Parts: LeavesEdible Uses: Young leaves - cooked[177]. A famine food, they are only used when all else fails.

nrakta E. Asia - Japan. ksacta In open places at elevations of 150 - 1700 metres[275].

propta Seed - we have no information for this species but suggest sowing the seed in a cold frame as soon as it is ripe if this is possible, otherwise in late winter or early spring. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer. Softwood basal cuttings, 10 - 12cm long, in a sandy soil in a cold frame in early summer[200]. Cuttings of half-ripe wood, 8 - 10 cm with a heel, July/August in a frame[200]. Cuttings of mature wood of the current seasons growth. 20 cm long, November in a sheltered outdoor nursery bed[200].

nwatta An easily grown plant, succeeding in most fertile soils[11, 200]. Prefers a moist well-drained soil in sun or partial shade[200]. Tolerates atmospheric pollution[200]. Plants are very hardy, tolerating temperatures down to about -23°C[200]. Plants are very floriferous and can exhaust themselves, literally flowering themselves to death. The flowers are borne in the leaf nodes of the previous years growth and any pruning is therefore best done as soon as the plant has finished flowering[182]. Closely related to W. coraensis[11]. There are a number of named forms, selected for their ornamental value[200]. Plants in this genus are notably resistant to honey fungus[200].

easy, they can be planted out straight into their permanent positions.

nwatta Prefers a moist but well-drained soil in a sunny position[175]. Plants are at their best in semi-shade, though they are not too fussy[214] and can succeed in quite dense shade[208, 214]. They also grow well in a rock garden[1]. Plants are hardy to about -20°C[200]. A very ornamental plant[1] but it can be invasive, spreading freely by means of runners[187]. Plants are more or less evergreen, though they can be browned by severe frosts[214]. Plants sometimes self-sow in British gardens[214]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is suckering with new plants from runners away from the plant [2-1]. Heat Zone: 8-6.

6.2.329 Mimulus guttatus

Yellow Monkey Flower, Seep monkeyflower
5 tlin 9 cyuc 2 kcaak 0 tcan 2 dwat 0.6 m hkuc hmimhtut cyutli tcuphja7hns6s hwicli hrasljutnyikfrip hpa7tli flatprikliwis hpa7tmwattli hjonli

drutta Mimulus guttatus is a PERENNIAL growing to 0.6 m (2ft) by 0.6 m (2ft in). See above for USDA hardness. It is hardy to UK zone 6. It is in flower from July to September. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can grow in water.

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked[94, 105, 155, 172]. A slightly bitter flavour, they are added to salads[161, 183]. The leaves are used as a lettuce substitute[257].

dwatta Astringent Bach Poultice VulneraryThe plant is astringent, poultice and vulnerary[94, 172, 257]. A decoction of the leaves and stems has been used as a herbal steam bath for chest and back soreness[257]. A poultice of the crushed leaves has been applied to wounds, rope burns etc[257]. The plant is used in Bach flower remedies - the keywords for prescribing it are 'Fear or anxiety of a known origin'[209].

nrakta Western N. America - Alaska to Mexico. Naturalized in Britain. ksacta Streams and wet places below 3000 metres[187]. Banks of streams in Britain, where it appears quite native[17].

propta Seed - sow spring in a greenhouse and only lightly cover the seed[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. If you have sufficient seed it can also be sown in situ in late spring after the last expected frosts[200]. Division in spring[200]. Very easy, large divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer. Cuttings of softwood, 5cm long in spring or summer[200].

nwatta Prefers rather moist places such as damp borders, margins of streams and boggy spots[1, 111]. Grows well in heavy clay soils. Thrives in full sun so long as the soil does not dry out[200], otherwise it is best grown in partial shade[187]. Grows well in shallow water, but it can be invasive[200]. Hardy to at least -20°C[187]. There is some confusion over the naming of this plant, the entry on edibility may refer to M. luteus, which is closely related to this species.

6.2.330 Thuja plicata

Western Red Cedar, Giant Arborvitae, Giant Cedar, Incense Cedar, Western Red Cedar

5 tlin 8 cyuc 1 kcaak 0 tcan 2 dwat 60 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasljutnyikfrip hpa7tli flat-prikliwssip hpa7tmwattli hjonli

drutta Thuja plicata is an evergreen Tree growing to 60 m (196ft) by 12 m (39ft) at a fast rate. See above for USDA hardness. It is hardy to UK zone 6. It is in leaf all year, in flower from March to April, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on

the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Inner barkEdible Uses: GumInner bark - fresh or dried[2, 105, 161]. The inner bark can be dried, ground into a powder and then used as a thickening in soups etc or mixed with cereals when making bread. A pitch obtained from the trunk has been used as a chewing gum[257].

tcanta Baby care Basketry Brush Dye Fibre Fuel Fungicide Gum Hair Hedge Hedge Insulation Paper Roofing Scourer Shelterbelt Stuffing Thatching Tinder Wick Wood-Tolerant of light trimming and of reasonable exposure, this species can be grown as a hedge or as part of a shelter-belt[75]. An infusion of the boughs can be used as a hair wash to treat dandruff and scalp germs[257]. The fibrous inner bark can be pounded until it is soft and then used as a sponge for scouring dishes etc, or can be used for making rough clothing, blankets, mats, ropes, sanitary towels, a padding in a baby's cradle, nappies etc. Waterproof hats, capes, trousers, skirts etc can be made from the inner bark[257]. It is also used in thatching and as a stuffing material for mattresses[46, 61, 82, 99, 118, 171, 226, 257]. Inner bark strips have been used as a roofing material[257]. The bark has also been used to make paint brushes[257]. The inner bark has been used to make a wick for oil lamps[257]. The inner bark has been used for making baskets[257]. The roots are used in basket making, making nets etc[99]. The roots have been used in coiled and imbricated baskets[257]. The roots have been peeled, split and used to make coiled watertight baskets that can be used for boiling water[257]. The roots are harvested in the spring or early autumn when it is easier to remove the bark. The outer strips of the roots are used to make the bottom of the basket, the centre core is used in the coils and the root bark, because of its toughness, is used to make the edges[257]. The fibrous bark is used for roofing and the sides of shelters. It is also used as an insulation[61, 99]. A fibre obtained from the bark is used in making paper. The fibre is about 3.8mm long (this refers to the heartwood fibre, the inner bark fibre is probably longer)[189]. Branches can be harvested at any time of the year, they are cut into usable pieces and pre-soaked in clear water prior to cooking. They are then cooked for six hours or more with lye. It is difficult to rinse it to clear water because it seems to be a dye material[189]. The fibre is then hand pounded with mallets, or put through a blender or a ball mill for six hours. It is difficult to hydrate properly. The resulting paper is a rich deep brown/red[189]. The slender pliable branches are used as a high quality rope[257]. They are gathered in spring, peeled and, if thick, are split into halves or quarters. They are then twisted and worked until soft and pliable and finally woven together to make the rope[99]. A green dye can be obtained from the leaves and twigs[257]. The inner bark can be used as a tinder[257]. Wood - aromatic, light, soft, straight-grained, not strong, very resistant to decay. This resistance to decay is probably due to the existence of powerful fungicides in the wood[226]. The wood from fallen trees remains sound for at least 100 years[226]. It is pale to dark red in colour[226]. The wood was widely utilized by many native North American Indian tribes who used it for making a wide range of items including canoes, houses, totem poles, bowls, spoons, ladles and tools[226, 257]. It is currently used in making greenhouses[1, 11, 82, 171]. The wood is not of such good quality when grown in mild humid areas[1]. It makes a good fuel, burning with very little smoke, though it burns quickly[99].

dwatta Abortifacient Analgesic Antidandruff Antirheumatic Astringent Emmenagogue Febrifuge Kidney Odontalgic Pectoral Poultice Skin Stomachic TB VDWestern red cedar was employed medicinally by a number of native North American Indian tribes, who used it to treat a wide range of complaints[257]. It is seldom, if ever, used in modern herbalism. An infusion of the leaves has been used in the treatment of stomach pains and diarrhoea[257]. A decoction of the leaves has been used in the treatment of colds[257]. A decoction of the powdered leaves has been used externally to treat various internal pains, including rheumatism[257]. The leaf buds have been chewed in the treatment of toothaches

and sore lungs[257]. A decoction of the buds has been used as a gargle[257]. A decoction of the small branches has been used in the treatment of coughs, colds and tuberculosis[257]. A weak infusion has been drunk in the treatment of painful joints caused by rheumatism or arthritis[257]. A poultice of the crushed bough tips and oil has been applied to the back and chest in the treatment of bronchitis, rheumatism, stomach pains and swollen neck[257]. An infusion of the twigs has been used as a wash in the treatment of venereal disease sores[257]. A decoction of the boughs has been used as an antidandruff shampoo[257]. A decoction of the stem tips and the roots has been used in the treatment of colds[257]. An infusion of the bark and twigs has been used in the treatment of kidney complaints[257]. An infusion of the seeds and twigs has been used in the treatment of fevers[257]. The chewed bark, or a decoction of the bark, has been drunk to induce menstruation[257]. A moxa of the inner bark has been used as a counter-irritant for the skin[257]. A poultice of the inner bark has been applied to carbuncles[257]. The bark has been pounded until it is as soft as cotton and then used to rub the face[257]. The very soft bark has been used to bind wounds and cover dressings[257]. The shredded bark has been used to cauterize sores and swellings[257].

nrakta Western N. America - British Columbia to California. ksacta Grows singly and in small groves in moist to swampy soils, usually in shady forests, from sea-level to 1350 metres[60, 82, 99].

propta Seed - best sown when ripe in the autumn in a cold frame[113]. Stored seed germinates best if given a short cold stratification[113]. It can be sown in a cold frame in late winter. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. If growing large quantities of plants, the seed can be sown in an outdoor seed bed in mid spring[78]. Grow the plants on for two years and then plant them out into their permanent positions in late autumn or early spring. Cuttings of half-ripe wood, 5 - 8cm with a heel, July/August in a shaded frame. Forms roots by the end of September but it should be overwintered in a frame[78]. Cuttings of almost ripe wood, 5 - 10cm with a heel, September in a cold frame. Forms roots in the following summer. Plant out in autumn or spring[78].

nwatta Landscape Uses:Pest tolerant, Screen, Specimen. Prefers a moist loamy soil[1, 81]. Dislikes dry soils[11]. Not suitable for light sandy soils because it is shallow rooting[75], but it succeeds on most other soil types, even on waterlogged soils and heavy clays[81, 200]. Succeeds in chalky soils[200]. Prefers some shelter from the wind according to some reports[1, 81] whilst others say that it is fairly wind resistant[11, 75]. Trees tolerate salt winds[75] but not severe maritime exposure[K]. The wood and foliage are highly aromatic[226]. The foliage has a strong fruity smell, like pear-drops or crushed apples[185]. A fast growing tree, it often puts out new growth of 1 metre a year and can average 60cm a year for the first 40 years. Increase in girth can also be rapid, 5cm a year for the first 60 years has been recorded[185]. Sometimes planted for forestry in Britain[17], it is at its best in the moister western half of the country[11, 185]. There are many named varieties selected for their ornamental value[188]. Tolerant of light trimming, so long as this is not back into old wood, plants also retain their lower branches unless these are shaded out by neighbouring plants[11]. The foliage turns bronze in cold weather[81]. Trees are notably susceptible to honey fungus[81, 200]. Special Features: North American native, Inconspicuous flowers or blooms.

6.2.331 *Tsuga chinensis*

Chinese Hemlock
5 tin 9 cyuc 1 kcaak 0 tcan 2 dwat 45 m hkuc
pcimhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflat-prikliwis hpa7tmwatli hjonli

drutta *Tsuga chinensis* is an evergreen Tree growing to 45 m (147ft 8in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf all year, in flower in April, and the seeds ripen from October to November. The species is monoecious (individual flowers are either male or female, but both sexes can be

found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Inner barkEdible Uses: Tealinner bark - raw or dried, ground into a powder and then used as a thickening in soups etc or mixed with cereals when making bread[2, 46, 161]. A herbal tea is made from the young shoot tips[2, 62, 95, 159, 183]. These tips are also an ingredient of 'spruce beer'[183].

tcanta Dye Hedge Hedge Resin Tannin WoodApart from the report about the use of the wood, all the other uses listed below are based on the uses that *T. canadensis* is put to and a note in [46] that this species has similar uses. Yields a resin similar to *Abies balsamea*, it is gathered by incisions in the trunk or by boiling the wood[46, 61, 64]. The bark contains 8 - 14% tannin[46, 171]. The inner bark is used according to one report[82]. A brown dye is obtained from the bark[21, 46]. A pitch (called hemlock pitch), is obtained by distillation of the young branches[46]. Tolerant of light trimming, plants can be grown as a hedge[81]. This species does not make a good hedge in Britain[200]. Wood - soft, durable. Used for shingles[82]. The timber is used for construction, aircraft, furniture, and in mines[266].

dwatta Astringent Diaphoretic DiureticThe bark is astringent, diaphoretic and diuretic[21]. A tea made from the inner bark or twigs is helpful in the treatment of kidney or bladder problems, and also makes a good enema for treating diarrhoea[21]. It can also be used as a gargle or mouthwash for mouth and throat problems or externally to wash sores and ulcers[21]. The powdered bark can be put into shoes for tender or sweaty feet or for foot odour[21].

nrakta E. Asia - C. and W. China. ksacta Forests, especially on steep cliffs, 2300 - 3000 metres[109]. Mountains, mixed forests, valleys and river basins at elevations of 1000 - 3500 metres[266].

propta Seed - it germinates better if given a short cold stratification[80, 113] and so is best sown in a cold frame in autumn to late winter. It can also be sown in early spring, though it might not germinate until after the next winter. If there is sufficient seed, an outdoor sowing can be made in spring[78]. Pot-grown seedlings are best potted up into individual pots once they are large enough to handle - grow them on in a cold frame and plant them out in early summer of the following year. Trees transplant well when they are up to 80cm tall, but they are best put in their final positions when they are about 30 - 45 cm or less tall, this is usually when they are about 5 - 8 years old[200]. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200].

nwatta An easily grown plant, it thrives best when growing in a deep well-drained soil in the western parts of Britain where it appreciates the higher rainfall[11]. However, it succeeds in most soils and positions, being especially good on acidic sandy soils[81] but also tolerating some lime[11] so long as there is plenty of humus in the soil[208]. Plants are very shade tolerant when young, but need more sunlight as they grow older[81, 200]. Plants are thin and poor when grown in dry or exposed places[200]. A very slow growing tree in most of Britain but probably faster in the far west and in Ireland[185]. Plants require hot humid summers and do not usually thrive in Britain[200]. Plants are very liable to injury by late frosts[1], they are often shrubby in cultivation[200]. Plants in this genus are notably resistant to honey fungus[200].

6.2.332 *Ulmus wallichiana*

5 tin 9 cyuc 1 kcaak 0 tcan 1 dwat 35 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Ulmus wallichiana* is a deciduous Tree growing to 35 m (114ft 10in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils.

(has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

pcista The seeds probably contain hydrogen cyanide. This is the ingredient that gives almonds their characteristic flavour. Unless the seed is very bitter it should be perfectly safe in reasonable quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105]. The fruit is up to 1cm across[200].

nrakta E. Asia - Japan. ksacta Mountains, C. and S. Japan[58].

propta Seed - best sown as soon as it is ripe in a cold frame[78, 80]. If you have sufficient seed it can be sown in an outdoor seedbed[78, 80]. Stored seed germinates better if given 2 weeks warm then 14 - 16 weeks cold stratification[98], so sow it as early in the year as possible. Prick out the seedlings into individual pots when they are large enough to handle. Seedlings are very slow to put on top-growth for their first year or two[11], but they are busy building up a good root system. It is best to keep them in pots in a cold frame for their first winter and then plant them out into their permanent positions in late spring.

nwatta Succeeds in most reasonably good soils in an open sunny position[11]. Prefers an acid soil[121]. Tolerates light shade[188], though it fruits better in a sunny position[K]. Plants are susceptible to fireblight[188].

6.2.379 *Callicarpa japonica*

Beautyberry, Japanese callicarpa, Japanese Beautyberry
5 tin 8 cyuc 1 kcaak 0 tcan 0 dwat 2 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Callicarpa japonica* is a deciduous Shrub growing to 2 m (6ft 7in) at a medium rate. It is in flower in August, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Edible Uses: TeaThe leaves are a tea substitute[177, 183].

nrakta E. Asia - China, Japan, Manchuria.. ksacta A pioneer species of cut-over lands[58]. Mixed forests on mountain slopes or in valleys at elevations of 200 - 900 metres[266].

propta Seed - sow February in a greenhouse[78]. Only just cover the seed[138]. Germination usually takes place within 1 - 3 months at 18°C[138]. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter, planting them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood 10cm long, July/August in a frame. High percentage[78]. Cuttings of mature wood of the current season's growth with a heel[78] taken in early spring[200].

nwatta Landscape Uses:Border, Cascades, Container, Erosion control, Massing, Standard, Specimen. Requires a sunny position or light dappled shade[11, 200]. Prefers a highly fertile well-drained loamy soil[11, 200]. This species is only really hardy in the milder parts of Britain, requiring a warm sunny corner[11, 182], though some forms should prove to be hardier. A very ornamental[1] and polymorphic species[58]. Requires cross-pollination for good fruit production[182]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: Fragrant foliage, Not North American native, Inconspicuous flowers or blooms.

6.2.380 *Viburnum phlebotrichum*

5 tin 9 cyuc 1 kcaak 0 tcan 0 dwat 2.5 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli dtaxxre7t hjonli

drutta *Viburnum phlebotrichum* is a deciduous Shrub growing to 2.5 m (8ft 2in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177]. The ovoid fruit is about 9mm long and contains a single large seed[200].

nrakta E. Asia - Japan. ksacta Mountains in C. and S. Japan[58].

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

nwatta An easily grown plant, it succeeds in most soils but is ill-adapted for poor soils and for dry situations[1]. It prefers a deep rich loamy soil in sun or semi-shade[11, 200]. Best if given shade from the early morning sun in spring[200]. Plants are self-incompatible and need to grow close to a genetically distinct plant in the same species in order to produce fruit and fertile seed[11, 200].

6.2.381 *Mahoberberis aquisargentii*

5 tin 9 cyuc 1 kcaak 0 tcan 2 dwat 2 m hkuc
pcimhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Mahoberberis aquisargentii* is an evergreen Shrub growing to 2 m (6ft) by 2 m (6ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year; in flower from January to March. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: The fruit is almost certainly edible, but we do not know what its quality is[K].

tcanta Hedge HedgeThe plant has viciously spiny leaves and makes a good boundary shrub[200].

dwatta Antibacterial Antitumor DysenteryBerberine, universally present in rhizomes of Berberis and Mahonia species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Licorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

post. Keep moist and pot up as soon as the plants are large enough to handle. Very difficult[200]. Division. The plants usually spread very freely when well sited and should not really need any assistance.

nwatta Prefers a moist soil with a pH between 6.5 and 7.5[200]. Plants are hardy to about -30°c[200]. Plants have a deep and penetrating root system and can be invasive. If grown in the garden they are best kept in bounds by planting them in a large container which can be sunk into the ground[200].

6.2.376 *Paeonia suffruticosa*

Moutan, Moutan peony, Tree Peony, Japanese Tree Peony 5 tlin 8 cyuc 1 kcaak 0 tcan 2 dwat 2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikli-wisslip hpa7tmwatli fyifxre7t hjonli

drutta *Paeonia suffruticosa* is a deciduous Shrub growing to 2 m (6ft) by 3 m (9ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

ckaakta Edible Parts: FlowersEdible Uses: Flowers - cooked[46, 61, 177]. The fallen flower petals are parboiled and sweetened for a teatime delicacy, or cooked in various dishes[183].

tcanta FuelThe stems are used as firewood[11]. The plant is quite slow growing so could not really be seen as a source of fuel[K].

dwatta Analgesic Antibacterial Antiinflammatory Antipyretic Antispasmodic Emmenagogue Sedative Styptic TonicThe root and root bark is analgesic, antibacterial, anti-inflammatory, antipyretic, antispasmodic, emmenagogue, sedative, styptic and tonic[46, 61, 174, 176, 178, 218, 279]. An extract of the plant has antibacterial activity, inhibiting the growth of *Staphylococcus*, *Bacillus dysenteriae*, *Typhoid bacillus*, *Paratyphoid bacillus*, *Proteus*, *Pseudomonas*, *E. coli*, *Haemophilus pertussis* and *Streptococcus*[176, 218]. The plant is used internally in the treatment of fevers, boils, menstrual disorders, nosebleeds, ulcers, irritability and gastrointestinal infections[238]. This remedy should only be used under the supervision of a qualified practitioner[238]. The herb acts as a synergist when used with liquorice (*Glycyrrhiza spp*) [218]. A tea made from the dried crushed petals of various peony species has been used as a cough remedy, and as a treatment for haemorrhoids and varicose veins[250].

nrakta E. Asia - China to the Himalayas. ksacta Scrub in mountains[184]. Cliffs at elevations around 300 metres[266].

propta Seed - best sown as soon as it is ripe in a cold frame[250]. When sown fresh, the seed produces a root about 6 weeks after sowing with shoots formed in the spring[200]. Stored seed is much slower, it should be sown as soon as possible in a cold frame but may take 18 months or more to germinate[200]. The roots are very sensitive to disturbance, so many growers allow the seedlings to remain in their pots for 2 growing seasons before potting them up. This allows a better root system to develop that is more resilient to disturbance[250]. If following this practice, make sure you sow the seed thinly, and give regular liquid feeds in the growing season to ensure the plants are well fed. We usually prick out the seedlings into individual pots as soon as they are large enough to handle, and then grow them on in a cold frame for at least two growing seasons before planting them out when they are in growth in the spring[K].

nwatta Landscape Uses:Border, Foundation, Seashore, Specimen. Requires a deep rich soil, preferably neutral or slightly alkaline[1], doing quite well in sun or light shade[1]. Prefers a limy soil and a sheltered position[200]. Plants are tolerant of a wide range of soil conditions, but will not survive if the soil becomes waterlogged or is too dry[250]. This species is lime tolerant[200]. Plants grown on sandy soils tend to produce more leaves and less flowers, whilst those growing on clay take longer to become established but produce better blooms[250]. Hardy to about -20°c[184], plants do better in the north of Britain than they do in the south

and are generally best if given an open northerly aspect[11]. Plants come into growth early in the year and are then subject to damage by late frosts, they are therefore best sited in a position that is shaded from the early morning sun[11]. The branches are brittle and very subject to wind damage, especially when young[200]. There is some confusion over the name of this species, Chinese botanists believing that it was based on a cultivar. They do not recognise this name, instead raising to specific status two of its sub-species as *P. rockii* (Haw. and Lauener.) Hong, and *P. jishanensis* Hong. and *W.Z.Zhao* (syn *P. spontanea* (Rehder.) Hong, and *W.Z.Zhao*.) [214]. Most modern treatments no longer recognise this as a separate species, though some people use the name to house the large number of garden forms of tree peonies that have been developed over the centuries[250]. A very ornamental plant[1], there are many named varieties[182]. It grows best in areas with long hot summers[1] and requires an airy position because it is very subject to fungal attack[11]. Plants in this genus are notably susceptible to honey fungus[200]. The flowers of some forms of this species are pleasantly scented[245]. Scented forms include 'Flora', 'Fragrans Maxima', 'Kimpai' and 'Kokuho'[245]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. A very greedy plant inhibiting the growth of nearby plants, especially legumes[54]. The plant does not really need much pruning apart from removing dead or diseased stems. It is, however, very tolerant of pruning and can be cut right back to ground level if it requires rejuvenation[200]. Strongly resents root disturbance, taking some time to recover after being divided[1]. Peony species are usually self-fertile, though they will also hybridise with other species if these flower nearby at the same time[250]. Plants take 4 - 5 years to flower from seed[200]. They generally breed true from seed[1]. Cultivated in China as a medicinal plant[214]. Special Features:Attractive foliage, Naturalizing, Suitable for cut flowers, Suitable for dried flowers, Fragrant flowers.

6.2.377 *Senecio nemorensis fuchsii*

5 tlin 9 cyuc 1 kcaak 0 tcan 0 dwat 2 m hkuc hmimhtut cyutli tcup hwicli hyishrasjlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Senecio nemorensis fuchsii* is a PERENNIAL growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no mention of toxicity has been seen for this species, it belongs to a genus that contains a number of plants with a cumulative poisonous effect on the liver[65]. Some caution is advised.

ckaakta Edible Parts: StemEdible Uses: Young stems - pickled[177]. Some caution is advised, see the notes above on toxicity.

nrakta Europe to E. Asia. ksacta Not known
propta Seed - sow spring in a greenhouse and only just cover the seed. Make sure the compost does not dry out. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in early summer if they have grown sufficiently. Otherwise, grow them on in the greenhouse or cold frame for their first winter and plant them out the following year after the last expected frosts. Division in spring[200]. Root cuttings in early spring[200].

nwatta Succeeds in a sunny position in most well-drained moderately fertile soils[200]. This sub-species is the form that is used for food in Asia[177].

6.2.378 *Sorbus gracilis*

5 tlin 9 cyuc 1 kcaak 0 tcan 0 dwat 2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatprikli-wis hpa7tmwatli xre7t hjonli

drutta *Sorbus gracilis* is a deciduous Shrub growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in May. The species is hermaphrodite

It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

ckaakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked.

tcanta Dye Fibre String WoodA strong fibre is obtained from the inner bark. It is used for cordage, slow matches and sandals[146, 158]. The young shoots are used to make strong ropes[145]. A dye is obtained from the ashes of the burnt twigs[145]. The colour is not given. Wood - fairly hard, somewhat scented, fine grained, takes a good polish. Used for furniture[146, 158].

dwatta SkinSkin[145].

nrakta E. Asia - Himalayas from Afghanistan to W. Nepal. ksacta Broad-leaved forests and moist ravines, 1800 - 3000 metres[51].

propta Seed - if sown in a cold frame as soon as it is ripe, it usually germinates within a few days[200]. Stored seed does not germinate so well and should be sown in early spring[200]. The seed can also be harvested 'green' (when it has fully developed but before it dries on the tree) and sown immediately in a cold frame. It should germinate very quickly and will produce a larger plant by the end of the growing season[80]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Plants should not be allowed to grow for more than two years in a nursery bed since they form a tap root and will then move badly. Layering of suckers or coppiced shoots[200].

nwatta Prefers a fertile soil in full sun[188], but is easily grown in any soil of at least moderate quality so long as it is well drained[1]. Susceptible to 'Dutch elm disease' according to one report[200], whilst another says that it might be resistant[11]. This disease that has destroyed the greater part of all the elm trees growing in Britain. The disease is spread by means of beetles. There is no effective cure (1992) for the problem, but most E. Asian, though not Himalayan, species are resistant (though not immune) to the disease so the potential exists to use these resistant species to develop new resistant hybrids with the native species[200]. The various species of this genus hybridize freely with each other and pollen is easily saved, so even those species with different flowering times can be hybridized[200].

6.2.333 *Pterocarya rhoifolia*

Japanese Wingnut

5 tlin 9 cyuc 1 kcaak 0 tcan 0 dwat 30 m hkuc htut cyutli tcup hwicli jlutnyik hpa7tli flatprikliwis hpa7tmwatli hjonli

drutta *Pterocarya rhoifolia* is a deciduous Tree growing to 30 m (98ft 5in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in June, and the seeds ripen from October to December. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

ckaakta Edible Parts: SeedEdible Uses: Seed[105]. No more details are given but the seed is very small and would be very fiddly to use.

tcanta WoodWood - light, soft, not easily cracked. Used for clogs, chopsticks etc.

nrakta E. Asia - China, Japan. ksacta Valleys and mountains all over Japan[58]. Wet areas along riverbanks and mountain streams in eastern Shandong, China[266].

propta Seed - best sown as soon as it is ripe in a cold frame[80, 113]. Pre-soak stored seed for 24 hours in warm water[80] then cold stratify for 2 - 3 months[98, 113]. Prick out the seedlings into individual pots as soon as they are large enough to handle and grow them on in the greenhouse for their first winter. Plant them out in late spring or early summer of the following year[240]. Cuttings of half-ripe wood, July/August in a frame[113]. Cuttings of mature shoots, November in a frame. Only use vigorous shoots[113]. Layering. Division of suckers in the dormant season[188].

nwatta Prefers a sunny position in a rich strong loam with abundant moisture at the roots[11, 200]. Succeeds in areas that do not experience prolonged winter temperatures

below about -12°c[200], but young plants and the young shoots of older trees can be cut back by winter frosts[11]. The leaves are aromatic when bruised[245]. Plants in this genus are notably resistant to honey fungus[200].

6.2.334 *Cedrus libani*

Cedar Of Lebanon

5 tlin 8 cyuc 1 kcaak 0 tcan 1 dwat 30 m hkuc htut cyutli hgatyuctcup hwicli hrasjlutnyik hpa7tli flatprikli-wisslip hpa7tmwatli hjonli

drutta *Cedrus libani* is an evergreen Tree growing to 30 m (98ft) by 15 m (49ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, in flower from October to November, and the seeds ripen from October to December. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. It cannot tolerate atmospheric pollution.

ckaakta Edible Parts: MannaEdible Uses: A manna is obtained from the tree[2, 105]. No more details were given in the report.

tcanta Essential Resin WoodAn oil similar to turpentine is obtained from the wood[46, 61]. An essential oil from the wood is used in perfumery[61]. Wood - moderately hard, durable. Used for construction[1, 46, 61]. The wood is extremely durable and retains its delightful fragrance for many years[245].

dwatta Antiseptic ExpectorantThe leaves and the wood are antiseptic and expectorant. They act to disinfect the respiratory tract[254].

nrakta N. Africa to W. Asia - Lebanon, Syria and Turkey. ksacta Forms forests at 1200 - 2000 metres[11].

propta Seed - collect the cones in winter and keep in a warm room until they open[11]. Sow immediately in a cold frame[78]. One report says that a short cold stratification of one month improves germination rates[113]. Keep the seed pot moist, but be careful because the young seedlings are very prone to damp off, keep them well ventilated[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a cold frame for their first winter and plant them out into their permanent positions in late spring or early summer. Give them some protection from winter cold for their first winter or two outdoors[K]. Cuttings of terminal shoots can be tried in a frame in November but they are very difficult[113].

nwatta Landscape Uses:Espalier, Pest tolerant, Specimen. Thrives on moist soils, being very tolerant of chalk, dry sites and of drought when it is established[11, 81, 200]. Prefers a rich loam or a sandy clay in full sun[1]. Succeeds in warm dry areas with less than 40cm of rain a year, but also in areas with cool summers and up to 200cm of rain[200]. Very intolerant of atmospheric pollution[11, 81]. Small trees less than 50cm tall establish much quicker and better than taller trees, those more than 2 metres tall are difficult to establish[200]. Larger trees will check badly and hardy put on any growth for several years. This also badly affects root development and wind resistance[200]. Fairly slow growing, trees rarely average more than 30cm increase in height per year[185]. Trees can be very long lived, to 300 years or more[185]. There are several named varieties selected for their ornamental value[188]. Small male cones are formed on the lower branches of trees, whilst the larger female cones are formed on higher branches[238]. These female cones persist on the tree for 2 - 3 years before breaking up[238]. Trees are notably susceptible to honey fungus[81, 200]. The trees have a broad canopy and tend to hold any falling snow. This can lead to branches being broken by the weight of snow[81]. Special Features: Not North American native, Inconspicuous flowers or blooms.

6.2.335 *Zelkova serrata*

Japanese Zelkova, Saw Leaf Zelkova

5 tlin 8 cyuc 1 kcaak 0 tcan 0 dwat 25 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli hjonli

drutta Zelkova serrata is a deciduous Tree growing to 25 m (82ft) by 10 m (32ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to May, and the seeds ripen from September to November. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young leaves - cooked[105, 171].

tcanta WoodWood - tough, hard, beautifully grained. Used for tool handles, construction, furniture etc[46, 61, 151].

nrakta E. Asia - E. China, Japan. ksacta Lowlands and mountains of C. and S. Japan[58]. Valleys, beside streams at elevations of 500 - 2000 metres in China[266].

propta Seed - best sown in a cold frame as soon as it is ripe. Stored seed requires stratification and should be sown as early in the year as possible[78, 200]. Germination rates are variable[78]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts.

nwatta Landscape Uses:Pest tolerant, Aggressive surface roots possible, Specimen, Street tree. An easily grown plant, it succeeds in almost any good soil, acid or alkaline, preferring a deep well-drained moist loam[11, 200]. Prefers a moderately sheltered position[11]. Relatively shade tolerant[200]. A fast growing tree[200]. Dormant plants are very cold-tolerant, but they are sometimes damaged by late spring frosts when they are young[11]. Plants are susceptible to Dutch Elm Disease, but the beetle that is the vector of this disease rarely feeds on Zelkova so infestation is rare[11, 200]. Plants in this genus are notably resistant to honey fungus[200]. Special Features:Not North American native, Inconspicuous flowers or blooms.

6.2.336 Fraxinus angustifolia

Narrow-Leaved Ash

5 tlin 9 cyuc 1 kcaak 0 tcan 0 dwat 25 m hkuc htut cyutli kyuctup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Fraxinus angustifolia is a deciduous Tree growing to 25 m (82ft) by 12 m (39ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: Edible Uses: CondimentThe fruit is used as a condiment[177, 183].

nrakta S. Europe, N. Africa, W. Asia, ksacta Mostly dryish rocky places in macchie, deciduous scrub or in pine and mixed forest, 650 - 1700 metres in Turkey[93].

propta The seed is best harvested green - as soon as it is fully developed but before it has fully dried on the tree - and can then be sown immediately in a cold frame[80]. It usually germinates in the spring[80]. Stored seed requires a period of cold stratification and is best sown as soon as possible in a cold frame[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant them out into their permanent positions or a nursery bed in late spring or early summer of the following year. If you have sufficient seed then it is possible to sow it directly into an outdoor seedbed, preferably in the autumn. Grow the seedlings on in the seedbed for 2 years before transplanting either to their permanent positions or to nursery beds.

nwatta Prefers a deep loamy soil, even if it is on the heavy side[1, 200]. Most members of this genus are

gross feeders and require a rich soil[200]. Plants succeed when growing in exposed positions[200] and also in alkaline soils[11]. They tolerate atmospheric pollution[200]. Quite cold-hardy when dormant, the young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. This species is closely related to *F. excelsior*[11]. A very ornamental tree[1], there are several named forms, selected for their ornamental value[200]. This species might be dioecious, in which case male and female plants must be grown if seed is required.

6.2.337 Carya aquatica

Water Hickory

5 tlin 9 cyuc 1 kcaak 0 tcan 0 dwat 20 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyif hjonli

drutta Carya aquatica is a deciduous Tree growing to 20 m (65ft 7in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf from June to October, in flower from April to May. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: SeedEdible Uses: Seed - raw or cooked. Astringent[177]. The seed is up to 35mm long, it is produced in clusters of 3 - 4 and has a thin shell, but the kernel is very bitter[11, 82, 229]. The seed ripens in late autumn and, when stored in its shell in a cool place, will keep for at least 6 months[K].

tcanta Fuel WoodWood - heavy and close grained but soft and brittle, which limits its use[229, 235]. It weighs 46lb per cubic foot and is used mainly in fencing and as a fuel, where it yields considerably more heat than most woods[229, 235].

nrakta South-eastern N. America - Florida to Texas, north to Illinois. ksacta Bottomlands and swamps, in ground that is often inundated for at least part of the year[43]. The best specimens grow on deep well-drained alluvial soils[229].

propta Seed - requires a period of cold stratification. It is best sown in a cold frame as soon as it is ripe[78]. Stored seed should be kept moist (but not wet) prior to sowing and should be sown in a cold frame as soon as possible[78]. Where possible, sow 1 or 2 seeds only in each deep pot and thin to the best seedling. If you need to transplant the seedlings, then do this as soon as they are large enough to handle, once more using deep pots to accommodate the tap root. Put the plants into their permanent positions as soon as possible, preferably in their first summer, and give them some protection from the cold for at least the first winter[78, K]. Seed can also be sown in situ so long as protection is given from mice etc and the seed is given some protection from cold[200] (a plastic bottle with the top and bottom removed and a wire mesh top fitted to keep the mice out is ideal)

nwatta Prefers a deep moisture-retentive loam in a sunny sheltered position, requiring a good summer for best development[1, 63, 137, 200]. A slow growing tree[200], it does not begin bearing seed until more than 20 years old[229]. Most species in this genus have quite a wide range of distribution and, in order to find trees more suited to this country, seed from the most appropriate provenances should be sought[137]. Most trees growing in Britain at present tend to only produce good seed after hot summers[137]. *Carya aquatica* hybridizes with *C. illinoensis* (*C. × lecontei* Little) and is reported to hybridize with the tetraploid *C. texana* [*C. × ludoviciana* (Ashe) Little][270]. Plants are strongly tap-rooted and should be planted in their permanent positions as soon as possible[1, 137]. Sowing in situ would be the best method so long as the seed could be protected from mice[1, 200]. Trees are late coming into leaf (usually late May to June) and lose their leaves early in the autumn (usually in October)[137]. During this time they cast a heavy shade. These factors combine to make the trees eminently suitable for a mixed woodland planting with shrubs and other trees beneath them[137]. Plants in this genus are notably resistant to honey fungus[200]. Trees are self-fertile but larger

nwatta A rapid grower, it is of easy cultivation succeeding in most soils that are well drained[1], avoiding acid soils in the wild[17]. Prefers a sunny position[238]. A very deep-rooted climbing plant[7], attaching itself to other plants by means of tendrils[4]. The plant is not eaten by rabbits[17]. Plants can be easily encouraged by scattering ripe seed along the base of hedgerows[200]. Dioecious, male and female plants must be grown if seed is required[200].

6.2.373 Eleutherococcus gracilistylus

Wu Jia Pi

5 tlin 9 cyuc 1 kcaak 0 tcan 3 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hyishrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Eleutherococcus gracilistylus is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. It can tolerate atmospheric pollution.

kcakta Edible Parts: FlowersEdible Uses: Flowers[177]. No more details are given.

dwatta Antibacterial Antirheumatic Diuretic MiscelanyThe leafy shoots are tonic and are also believed to alleviate internal injuries by dispelling blood[218]. The root bark is antibacterial, antirheumatic and diuretic[176]. It is used in the treatment of arthritis, backache and a host of other ailments. A medicinal wine made from it is commonly on sale in China[218]. A decoction of the stem bark or the roots is used in the treatment of rheumatoid arthritis, aches and pains in the back and legs, open sores on the scrotum, beriberi and traumatic injuries[147]. The plant is aphrodisiac, nutritive and tonic[218].

nrakta E. Asia - China. ksacta Wasted slopes or shrub thickets[147].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame[200]. It can be slow to germinate. Stored seed requires 6 months warm followed by 3 months cold stratification[113] and can be very slow to germinate[133]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for at least the first winter. Plant out in late spring or early summer. Cuttings of half-ripe wood, July/August in a frame[113, 200]. Cuttings of ripe wood of the current season's growth, 15 - 30cm long in a cold frame[238]. Root cuttings in late winter[200]. Division of suckers in the dormant season[200].

nwatta Succeeds in an open loamy soil[1], preferring a well-drained humus-rich soil in full sun[200]. Tolerates poor soils and atmospheric pollution[200]. Plants are hardy to at least -10 to -15°C if they are sheltered from cold winds[200]. This species is closely related to *E. sieboldianus*[200].

6.2.374 Rubus coreanus

Korean Bramble

5 tlin 9 cyuc 1 kcaak 0 tcan 2 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Rubus coreanus is a deciduous Shrub growing to 3 m (9ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177]. Small with a poor flavour[11]. The dark red or purplish black fruit is 5-8 mm in diameter[266].

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

dwatta Aphrodisiac Astringent Ophthalmic Restorative Tonic UrinaryThe fruit is aphrodisiac, astringent, restorative and tonic[176, 218, 238]. It is taken internally in the treatment of complaints associated with disturbed liver and kidney functions, such as back pain, urinary dysfunction, premature greying, blurred vision, infertility, impotence and premature ejaculation[238, 279]. The fruit is harvested when fully ripe and can be used fresh or dried[238]. The juice of the bruised leaves or a decoction of the root are used in the treatment of ophthalmia[218]. The seed is astringent and tonic[218].

nrakta E. Asia - China, Japan, Korea. ksacta 300 - 900 metres in W. Hupeh[109]. Thickets on slopes, montane valleys, riverbanks and roadsides at elevations of 100 - 3100 metres[266].

propta Seed - requires stratification and is best sown in early autumn in a cold frame. Stored seed requires one month stratification at about 3°C and is best sown as early as possible in the year. Prick out the seedlings when they are large enough to handle and grow on in a cold frame. Plant them out into their permanent positions in late spring of the following year. Division of the suckers in early spring or just before leaf-fall in the autumn[200].

nwatta Easily grown in a good well-drained loamy soil in sun or semi-shade[1, 11, 200]. Plants are rarely cultivated for their edible fruit in Japan[58]. This species is a raspberry with biennial stems, it produces a number of new stems each year from the perennial rootstock, these stems fruit in their second year and then die[200]. Plants in this genus are notably susceptible to honey fungus[200].

6.2.375 Equisetum telmateia

Giant Horsetail

5 tlin 9 cyuc 1 kcaak 3 tcan 1 dwat 2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli hjonli

drutta Equisetum telmateia is a PERENNIAL growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in March, and the seeds ripen in April. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Large quantities of the plant can be toxic. This is because it contains the enzyme thiaminase[172], a substance that can rob the body of the vitamin B complex[65]. In small quantities this enzyme will do no harm to people eating an adequate diet that is rich in vitamin B, though large quantities can cause severe health problems. The enzyme is destroyed by heat or thorough drying, so cooking the plant will remove the thiaminase[172]. The plant also contains equisetin acid - see the notes on medicinal uses for more information[213].

kcakta Edible Parts: StemEdible Uses: Strobil (the fertile shoots in spring) - raw or cooked[256]. The tough outer fibres are peeled off, or can be chewed and then discarded[256]. The vegetative shoots, produced from late spring onwards, were occasionally cleaned of their leaves, sheathing and branches and then eaten by native North American Indians, but only when very young and tightly compacted[256]. Root - cooked[257].

tcanta Basketry Fungicide Hair Liquid feed Polish SandpaperThe stems are very rich in silica[4]. They are used for scouring and polishing metal[1, 4, 46, 61, 99, 257] and as a fine sandpaper[54, 99, 257]. The stems are first bleached by repeated wetting and drying in the sun[74]. They can also be used as a polish for wooden floors and furniture[46, 178]. The infused stem is an effective fungicide against mildew, mint rust and blackspot on roses[14]. It also makes a good liquid feed[54]. Used as a hair rinse it can eliminate fleas, lice and mites[213]. The black roots have been used for imbrication on coiled baskets[257].

dwatta Astringent Diuretic PouliticeThe plant is astringent and diuretic[257]. A decoction has been used to treat 'stoppage of urine'[257]. A poultice of the rough leaves and stems is applied to cuts and sores[257].

nrakta Europe, including Britain, from Sweden south and east to N. Africa and W. Asia, N.W. N. America. ksacta Damp shady banks etc, to 350 metres[17].

propta Spores - best collected as soon as they are ripe in the spring and surface-sown immediately on a sterile com-

6.2.370 Clematis pierotii

5 tlin 9 cyuc 1 kcaak 0 tcan 0 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliw hpa7tmwatli xre7t hjonli

drutta Clematis pierotii is a deciduous Climber growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 6. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no reports of toxicity have been seen for this species, some if not all members of this genus are mildly poisonous. The toxic principle is dissipated by heat or by drying[65].

kcaakta Edible Parts: LeavesEdible Uses: Young leaves - cooked[177]. Some caution is advised, see the notes above on toxicity.

nrakta E. Asia - Japan, Korea. ksacta Woods and shrub-beries[273].

propta Seed - best sown as soon as it is ripe in a cold frame[164, 200]. Sow stored seed as soon as it is obtained in a cold frame. Pre-soak the seed for 12 hours in warm water and remove as much of the tail and outer coat as possible[164]. A period of cold stratification is beneficial[164]. The seed germinates in 1 - 9 months or more at 20°C[164]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant out in late spring or early summer, after the last expected frosts. Internodal cuttings of soft to semi-ripe wood, late spring in sandy soil in a frame[200]. Layering of old stems in late winter or early spring[200]. Layering of current seasons growth in early summer[200].

nwatta Prefers a deep moist soil with its roots in the shade. Dislikes poorly-drained heavy clay soils, but grows well in clay if grit is added for drainage[11, 200]. Dislikes light sandy soils[11]. Does well on chalk. Succeeds in acid as well as alkaline soils[200]. A twining plant[182]. The leaf-stalks wrap themselves around twigs and branches for support. When a side of the stalk touches an object, the growth on that side slows down whilst the other side grows at its normal rate - this causes the leaf stalk to entwine the object it is touching[212]. Plants flower on the current season's new shoots. They can usually be left unpruned, though weak or dead shoots can be removed and main shoots can be cut back by up to two thirds of their length if they are outgrowing their allotted area[273]. When planting out, in order to avoid the disease 'clematis wilt', it is best to plant the rootball about 8cm deeper in the soil. This will also serve to build up a good root crown of growth buds[200]. Plants in this genus are notably resistant to honey fungus[200]. Plants seem to be immune to the predations of rabbits[233]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

6.2.371 Deutzia scabra

Fuzzy pride-of-rochester. Deutzia

5 tlin 8 cyuc 1 kcaak 0 tcan 0 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliw hpa7tmwatli xre7t hjonli

drutta Deutzia scabra is a deciduous Shrub growing to 3 m (9ft) by 2 m (6ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcaakta Edible Parts: LeavesEdible Uses: Young leaves - cooked. A famine food, it is only used when all else fails[105, 177].

tcanta Nails WoodWood - fine grained. Used for mosaic and wooden nails[46, 61].

nrakta E. Asia - China, Japan, Korea. Locally naturalized in Austria[50]. ksacta Scrub and woodland edges in most areas of Japan[58].

propta Seed - sow February in a greenhouse and only just cover the seed[78, 175]. Germination is usually good,

taking 1 - 3 months at 18°C[78, 175]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts[78]. Cuttings of half-ripe wood, 10 - 12cm with a heel, end of June to July in a frame[11, 78]. Good to high percentage[78]. Cuttings of ripe wood, 20 - 25cm with a heel, either in an outdoor bed if it is sheltered enough, otherwise in a cold greenhouse[78].

nwatta Landscape Uses:Border, Foundation, Massing, Standard, Specimen. An easily grown plant, it tolerates most soils but prefers a moist well-drained fertile humus-rich soil with shade from the early morning sun when grown in areas with late frosts[11, 200]. Prefers a sunny sheltered position, it can be grown on a woodland edge[184]. Tolerates a limey soil[11]. Dormant plants are hardy to about -20°C[184]. The young growth, however, is subject to damage by late frosts and so a suitable position with shelter from early morning spring sunshine is best. A very ornamental plant[1], it is the best and most reliable species in this genus for growing in Britain[11]. A number of cultivars have been developed for their ornamental value[182]. Flowers are produced on the previous seasons wood[182]. Flowering can be increased by thinning the old shoots after flowering[188]. A very polymorphic plant[58]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: Not North American native, Blooms are very showy.

6.2.372 Bryonia dioica

Red Bryony, Cretan bryony

5 tlin 9 cyuc 1 kcaak 0 tcan 2 dwat 3.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli prikliw hpa7tmwatli nyanhjen hjonli

drutta Bryonia dioica is a PERENNIAL CLIMBER growing to 3.5 m (11ft) by 3 m (9ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to June. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All parts of the plant are poisonous[7, 65]. One report says it is very toxic[10], another says it is of very low toxicity[76]. The fresh root is a severe skin irritant[238].

kcaakta Edible Parts: LeavesEdible Uses: Young shoots - must be cooked[2, 105]. They are eaten in spring. Caution is advised in the use of this plant, see the notes above regarding toxicity.

dwatta Cathartic Cytotoxic Diaphoretic Expectorant Hydrogogue Irritant Pectoral Purgative VermifugeA powerful cathartic and purgative, bryony is used with great caution in present-day herbalism[254]. It is primarily prescribed for painful rheumatic conditions[254]. The root is cathartic, cytotoxic, diaphoretic, expectorant, hydrogogue, irritant, pectoral, purgative and vermifuge[4, 9, 19, 21, 46, 165]. It is used in small quantities internally in the treatment of various inflammatory conditions, bronchial complaints, asthma, intestinal ulcers, hypertension and arthritis[238]. Externally, it is applied as a rubefacient to muscular and joint pains and pleurisy[238]. The root, which can be 75cm long and 75mm thick[268], can be used fresh at any time of the year[7], it can also be harvested in the autumn and be dried for later use[4]. This plant should be used with great caution and only under the supervision of a qualified practitioner. See the notes above on toxicity. The whole herb has an antiviral effect[254].

nrakta Central and southern Europe, including Britain, to N. Africa and W. Asia. ksacta Scrub and woodland, especially on well-drained soils, avoiding acid soils[7, 17].

propta Seed - best sown as soon as it is ripe in a cold frame. Sow stored seed in late winter in a cold frame. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter, planting them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in early spring.

crops of better quality seeds are produced if cross-pollination takes place[229].

6.2.338 Sorbus japonica

5 tlin 9 cyuc 1 kcaak 0 tcan 0 dwat 20 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliw hpa7tmwatli xre7t hjonli

drutta Sorbus japonica is a deciduous Tree growing to 20 m (65ft 7in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

pcista The seeds probably contain hydrogen cyanide. This is the ingredient that gives almonds their characteristic flavour. Unless the seed is very bitter it should be perfectly safe in reasonable quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcaakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. The fruit is up to 13mm across[200] and is produced in bunches which makes harvesting easier[K].

nrakta E. Asia - Japan, Korea. ksacta Hills and mountains, C. and S. Japan[58].

propta Seed - best sown as soon as it is ripe in a cold frame[78, 80]. If you have sufficient seed it can be sown in an outdoor seedbed[78, 80]. Stored seed germinates better if given 2 weeks warm then 14 - 16 weeks cold stratification[98], so sow it as early in the year as possible. Prick out the seedlings into individual pots when they are large enough to handle. Seedlings are very slow to put on top-growth for their first year or two[11], but they are busy building up a good root system. It is best to keep them in pots in a cold frame for their first winter and then plant them out into their permanent positions in late spring.

nwatta Succeeds in most reasonably good soils in an open sunny position[11]. Tolerates light shade[188], though it fruits better in a sunny position[K]. Plants are susceptible to fireblight[188].

6.2.339 Thuja orientalis

Biota

5 tlin 9 cyuc 1 kcaak 0 tcan 3 dwat 15 m hkuc hmimhtut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatprikliw hpa7tmwatli hjonli

drutta Thuja orientalis is an evergreen Tree growing to 15 m (49ft) by 5 m (16ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. It can tolerate atmospheric pollution.

pcista The leaves are toxic if eaten[238]. The plant can also cause skin allergies in sensitive people[238].

kcaakta Edible Parts: SeedEdible Uses: Seed - after removing the bitterness[105, 179]. No more details are given, but the bitterness in seeds is usually removed either by leaching them in water or by thoroughly cooking them[K].

tcanta Dye Hedge Hedge Parasiticide WoodTolerant of regular trimming, though not into old wood, it can be grown as a dense hedge[149]. A yellow dye is obtained from the young branches[4]. Wood - durable in the soil, moderately hard, close grained, rather coarse grained, light, soft, brittle. Used for construction, cabinet making, cooperage[4, 146, 149, 227].

dwatta Antiasthmatic Antibacterial Antipyretic Antitussive Aperient Astringent Diuretic Dysentery Emmenagogue Emollient Expectorant Haemostatic Lentive Parasiticide Sedative Skin StomachicThis plant is commonly used in Chinese herbalism, where it is considered to be one of the 50 fundamental herbs[218]. Both the leaves and the seeds contain an essential oil consisting of borneol, bornyl acetate, thujone, camphor and sesquiterpenes[283]. The leaves also contain rhodoxanthin, amentoflavone, quercetin, myricetin, carotene, xanthophyll and ascorbic acid[283]. The leaves are antibacterial, antipyretic, antitussive, astringent, diuretic, emmenagogue, emollient, expectorant, febrifuge, haemostatic, refrigerant and stomachic[147, 176, 218, 238]. Their use is said to improve the growth of hair[147, 176, 238]. They are used internally in the treatment of coughs, haemorrhages, excessive menstruation, bronchitis, asthma, skin infections, mumps, bacterial dysentery, arthritic pain and premature baldness[238]. The leaves are harvested for use as required and can be used fresh or dried[238]. This remedy should not be prescribed to pregnant women[238]. The seed is aperient, lentive and sedative[147, 176, 218]. It is used internally in the treatment of palpitations, insomnia, nervous disorders and constipation in the elderly[238]. The root bark is used in the treatment of burns and scalds[218]. The stems are used in the treatment of coughs, colds, dysentery, rheumatism and parasitic skin diseases[218].

nrakta E. Asia - W. China, N. Korea. A small wild population is also found in N.E. Iran. ksacta Steep dry rocky valley slopes[11, 200].

propta Seed - best sown when ripe in the autumn in a cold frame. Stored seed germinates best if given a short cold stratification. It can then be sown in a cold frame in late winter. Plants make very little growth in their first year[78]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. If there is sufficient seed it is worthwhile trying a sowing in an outdoor seed bed in April[78]. Grow the plants on for at least two years before planting them out in the winter. Cuttings of half-ripe wood, 5 - 8cm with a heel, July/August in a shaded frame. Forms roots by the end of September but should be overwintered in a frame[78]. Cuttings of almost ripe wood, 5 - 10cm with a heel, September in a cold frame. Forms roots in the following summer. Plant out in autumn or spring[78].

nwatta Prefers a moist loamy soil[149]. Grows best on dry freely draining sites, often alkaline in reaction[200]. Does well over old building rubble[200]. Tolerant of dry dusty sites and of atmospheric pollution in towns[81]. Prefers a sunny sheltered position[238]. Easily transplanted[149]. There are many named varieties selected for their ornamental value. Produces seed freely in cultivation[200]. A slow growing tree, it does not really thrive in Britain[11], especially in the western part of the country[200]. The best specimens are to be found in towns or cities such as Oxford and very sharply drained soils in gardens[185]. Plants cannot regenerate from old wood. Pruning is not normally necessary for this species, any pruning that is carried out should be done with care[238]. Plants are susceptible to attacks by honey fungus[238]. Plants are monoecious, male catkins being produced at the tips of branches and female cones at the base[283].

6.2.340 Calocedrus decurrens

Incense Cedar, California Incense Cedar

5 tlin 8 cyuc 1 kcaak 0 tcan 1 dwat 15 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatprikliw hpa7tmwatli hjonli

drutta Calocedrus decurrens is an evergreen Tree growing to 15 m (49ft) by 2 m (6ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower in May, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Edible Uses: CondimentThe dense leaflets have been used as a flavouring and protection when leaching acorns[257].

tcanta Basketry Broom Containers Miscellany WoodThe boughs and twigs have been used to make brooms[257]. The roots have been used as overlay twine warps and overlay twine weft bases in making baskets[257]. The bark has been made into baskets[257]. Wood - soft, light, close grained, very durable in the soil though it is often damaged by dry rot[82]. It has a powerful, incense-like fragrance[245] and is used for making shingles, lathes, fencing, pencils, construction etc[46, 61, 81, 171]. Mature trees are often infected by dry rot, so they are not considered to be a major timber species[229].

dwatta Miscellany StomachicA decoction of the leaves has been used to treat stomach troubles[257]. Steam from an infusion of the leaves has been inhaled in the treatment of colds[257].

nrakta South-western N. America - Oregon to California. ksacta Found on a variety of soils, usually on western slopes at an altitude of 700 - 2500 metres[229]. The best specimens are found on deep well-drained slightly acidic sandy loam soils[229].

propta Seed - sow early spring in a greenhouse[245]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in a greenhouse or cold frame for their first winter. Plant them out in late spring or early summer, after the last expected frosts and consider giving them some protection from the cold for their first winter outdoors. Cuttings of the current season's growth, taken in mid autumn, in a light sandy soil in a cold frame[245].

nwatta Landscape Uses:Pest tolerant, Screen, Specimen. Succeeds in full sun in a moist well-drained soil that is neutral to acid, though it will also survive on dry alkaline soils[200]. Plants are shade tolerant when young[200]. It grows best in a position that is sheltered from strong winds[245]. Trees are slow growing but long-lived in the wild, with specimens up to 1000 years old recorded[229]. They grow slowly in Britain, but they are perfectly hardy[11]. Young trees can grow 60cm in a year but they seldom average more than 30cm[185]. Growth virtually stops once the tree reaches 25 metres tall[185]. All parts of the plant are strongly aromatic[188, 245]. This species is strongly resistant to honey fungus[81, 188]. The tree exhibits very different crown habits dependant upon the area in which it is being grown[185, 200]. At one time these different habits were considered to be different sub-species, but it is recognised now that it is only climatic forces that cause the differences. Special Features: North American native, Fragrant foliage, Inconspicuous flowers or blooms.

6.2.341 Schizopragma hydrangeoides

Japanese Hydrangea Vine

5 tlin 8 cyuc 1 kcaak 0 tcan 0 dwat 12 m hkuc pcmhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flat-priklwis hpa7tmwatli xre7t hjonli

drutta Schizopragma hydrangeoides is a deciduous Climber growing to 12 m (39ft) by 12 m (39ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves - cooked[105, 177].

tcanta Plants can be allowed to sprawl and are then used as a ground cover for a shady position[188, 208].

nrakta E. Asia - Japan, Korea. ksacta Damp woods and thickets in mountains all over Japan[58].

propta Seed - sow late winter to early spring in a greenhouse. Germination is usually fair to very good[78]. Prick out the seedlings into individual pots once they are large enough to handle and grow them on in light shade in the greenhouse for their first winter, planting them out in late spring or early summer. Layering in spring directly into pots. A fair to good percentage[78], though it can be difficult to find suitable low

growth[202]. Cuttings of half-ripe wood, 4 - 5cm with a heel, July in a frame[1, 78]. Keep the cuttings moist[78].

nwatta Landscape Uses:Arbor. Requires a moist leafy soil and some shade at the roots. An easily grown plant[1], it prefers a good loamy soil and plenty of moisture[11]. Succeeds on most soil types, disliking only very alkaline soils[202]. Plants succeed in sun or shade[182], though they prefer full sun[202, 219]. In the hotter parts of Britain they prefer shade from the midday sun[219]. They succeed on north-facing walls[188, 219]. The fully dormant plant is hardy to about -20°C[182, 200]. Plants are slow to establish and slow-growing when young, though they speed up somewhat with age[202]. Plants do not normally require pruning, though any unwanted growth can be removed in the winter[219]. Plants have a similar growth habit to ivy (*Hedera helix*) climbing trees by means of aerial roots or growing along the woodland floor[1, 182]. Plants might need some help to become attached in their early years[182]. Some named varieties have been developed for their ornamental value[182]. Special Features:Not North American native, Attractive flowers or blooms.

6.2.342 Sorbus commixta

5 tlin 9 cyuc 1 kcaak 0 tcan 0 dwat 10 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Sorbus commixta is a deciduous Tree growing to 10 m (32ft) by 6 m (19ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in May, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

pcista The seeds probably contain hydrogen cyanide. This is the ingredient that gives almonds their characteristic flavour. Unless the seed is very bitter it should be perfectly safe in reasonable quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit - raw or cooked[105]. About 7.5mm across[200], it is produced in fairly large bunches making harvesting easy[K]. Leaves - cooked. A famine food when all else fails[177]. The leaves may contain cyanogens so caution is advised.

nrakta E. Asia - Japan. ksacta Mountains all over Japan[58].

propta Seed - best sown as soon as it is ripe in a cold frame[78, 80]. If you have sufficient seed it can be sown in an outdoor seedbed[78, 80]. Stored seed germinates better if given 2 weeks warm then 14 - 16 weeks cold stratification[98], so sow it as early in the year as possible. Prick out the seedlings into individual pots when they are large enough to handle. Seedlings are very slow to put on top-growth for their first year or two[11], but they are busy building up a good root system. It is best to keep them in pots in a cold frame for their first winter and then plant them out into their permanent positions in late spring.

nwatta Succeeds in most reasonably good soils in an open sunny position[11]. Dislikes dry soils[188]. Tolerates light shade[188], though it fruits better in a sunny position[K]. Plants are susceptible to fireblight[188]. This species is suitable for street planting[200].

6.2.343 Pyrus serrulata

5 tlin 9 cyuc 1 kcaak 0 tcan 0 dwat 10 m hkuc hmimhtut cyutli hgattcup hwicli hrasjlutnyikfrip hpa7tli flat-priklwis hpa7tmwatli xre7t hjonli

drutta Pyrus serrulata is a deciduous Tree growing to 10 m (32ft 10in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in May, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects.

hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flat-priklwis hpa7tmwatli xre7t hjonli

drutta Euonymus sachalinensis is a deciduous Shrub growing to 3.5 m (11ft 6in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. The seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by In-sects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Although no records of toxicity have been seen for this species, a number of plants in this genus are suspected of being poisonous and so some caution is advised.

kcakta Edible Parts: LeavesEdible Uses: Young leaves - boiled[105, 177]. Some caution is advised, see the notes above regarding possible toxicity.

tcanta WeavingThe white inner bark is used in making string shoes[151].

nrakta E. Asia - Japan, Korea, Sakhalin. ksacta Woods and thickets in Korea[151].

propta Seed - best sown as soon as it is ripe in a cold frame[121]. Stored seed requires 3 months cold stratification, so should be sown as early in the year as possible in a cold frame[113]. The seed can take 18 months to germinate. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5 - 7cm long taken at a node or with a heel, July/August in a frame. Very easy[200].

nwatta Landscape Uses:Massing, Screen. Thriving in almost any soil, including chalk, it is particularly suited to dry shaded areas[200]. Prefers a well-drained loamy soil[11]. A plant in an open position at Cambridge Botanical Gardens was 2 metres tall and laden with fruit in September 1989[K]. This species is often confused with *E. planipes*[121]. Special Features:Not North American native, Inconspicuous flowers or blooms.

6.2.367 Spiraea henryi

5 tlin 9 cyuc 1 kcaak 0 tcan 0 dwat 3 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Spiraea henryi is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Edible Uses: TeaA tea is made from the leaves[177].

nrakta E. Asia - C. and W. China. ksacta Thickets, 1700 - 2700 metres in W. Hupeh[109]. Rocky slopes, foothills and mountain forests at elevations of 1500 - 3000 metres[266].

propta Seed - we have no information for this species but suggest sowing the seed as soon as it is ripe in a cold frame if possible. It is likely to require stratification before it germinates, so stored seed should be sown in a cold frame as early in the year as you receive it. Prick out the seedlings into individual pots when they are large enough to handle, and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a light sandy soil a frame. Cuttings of mature wood of the current seasons growth, 15cm long, October/November in an outdoor frame[200]. Another report says that September is a good time to do this[11]. Division of suckers in early spring[200]. They can be planted out straight into their permanent positions.

nwatta Tolerates most soils[200], but prefers a good loamy soil, abundant moisture and full sunlight[11, 200]. Hybridizes freely with other members of this genus[11]. A very ornamental plant[1], it is closely related to *S. wilsonii*. [182] and to *S. canescens*[11].

6.2.368 Viburnum corylifolium

5 tlin 9 cyuc 1 kcaak 0 tcan 0 dwat 3 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli dyatxre7t hjonli

drutta Viburnum corylifolium is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177]. The ovoid fruit is about 8mm long and contains a single large seed[200].

nrakta E. Asia - China to India. ksacta Thickets in the Khasya hills, 1200 - 1800 metres[109, 146].

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

nwatta An easily grown plant, it succeeds in most soils but is ill-adapted for poor soils and for dry situations[1]. It dislikes chalky soils[1]. Prefers a deep rich loamy soil in sun or semi-shade[11, 200]. Best if given shade from the early morning sun in spring[200]. Plants are self-incompatible and need to grow close to a genetically distinct plant in the same species in order to produce fruit and fertile seed[11, 200].

6.2.369 Grewia biloba parviflora

5 tlin 9 cyuc 1 kcaak 0 tcan 0 dwat 3 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Grewia biloba parviflora is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit. No more details. The fruit is about 10mm in diameter[200].

nrakta E. Asia - E. China, Korea. ksacta Rocky places by roadsides[109].

propta Seed - we have no information for this species but suggest sowing the seed in late winter in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Layering.

nwatta Succeeds in most soils[200]. One report says that this species is not very hardy in Britain, preferring hotter summers than are usually experienced here[11]. Another report, however, says that it is hardy to about -30°C[200].

propta Seed - best sown as soon as it is ripe in a cold frame[164, 200]. Sow stored seed as soon as it is obtained in a cold frame. Pre-soak the seed for 12 hours in warm water and remove as much of the tail and outer coat as possible[164]. A period of cold stratification is beneficial[164]. The seed germinates in 1 - 9 months or more at 20°C[164]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant out in late spring or early summer, after the last expected frosts. Internodal cuttings of soft to semi-ripe wood, late spring in sandy soil in a frame[200]. Cuttings of half-ripe inter-nodal cuttings, June/July in a frame[202]. Layering of old stems in late winter or early spring[200]. Layering of current seasons growth in early summer[200].

nwatta Prefers a deep moist well-drained soil with its roots in the shade[182, 200]. Dislikes poorly-drained heavy clay soils, but grows well in clay if grit is added for drainage[11, 200]. Dislikes light sandy soils[11]. Does well on chalk[1]. Succeeds in acid as well as alkaline soils[200]. Thrives in exposed positions[182]. Plants are hardy to about -15°C[202]. A twining plant[182], it is fast growing[202]. The leafstalks wrap themselves around twigs and branches for support. When a side of the stalk touches an object, the growth on that side slows down whilst the other side grows at its normal rate - this causes the leaf stalk to entwine the object it is touching[212]. When planting out, in order to avoid the disease 'clematis wilt', it is best to plant the rootball about 8cm deeper in the soil. This will also serve to build up a good root crown of growth buds[200]. A very ornamental plant[1], the flowers are very fragrant[202]. They have a pronounced smell of meadowsweet, almost too powerful when inhaled close-up[245]. They are produced on the current season's growth and so any pruning of the plant is best carried out in the spring before new growth begins[219]. Plants rarely produce fertile seed in Britain[219]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54]. Plants seem to be immune to the predations of rabbits[233]. This species is notably resistant to honey fungus[88, 200].

6.2.364 Clematis serratifolia

5 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 3 m hkuc hmimhtut cyuti tcup hwicli hrasjlutnyik hpa7tli flatprikli-wisslip hpa7tmwatli xre7t hjonli

drutta Clematis serratifolia is a deciduous Climber growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from August to October, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no reports of toxicity have been seen for this species, some if not all members of this genus are mildly poisonous. The toxic principle is dissipated by heat or by drying[65].

kcakta Edible Parts: LeavesEdible Uses: Young shoots - cooked[105, 177]. Some caution is advised, see the notes above on toxicity.

nrakta E. Asia - N.E. China, N. Japan, Korea. ksacta Hedgerows, usually on calcareous soils. Dry forests, slopes, gravelly river banks at around 400 metres in hina[266].

propta Seed - best sown as soon as it is ripe in a cold frame[164, 200]. Sow stored seed as soon as it is obtained in a cold frame. Pre-soak the seed for 12 hours in warm water and remove as much of the tail and outer coat as possible[164]. A period of cold stratification is beneficial[164]. The seed germinates in 1 - 9 months or more at 20°C[164]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant out in late spring or early summer, after the last expected frosts. Internodal cuttings of soft to semi-ripe wood, late spring in sandy soil in a frame[200]. Layering of old stems in late winter or early spring[200]. Layering of current seasons growth in early summer[200].

nwatta Prefers a deep moist soil with its roots in the shade[11, 200]. Dislikes poorly-drained heavy clay soils, but

grows well in clay if grit is added for drainage[11, 200]. Dislikes light sandy soils[11]. Does well on chalk[1]. Succeeds in acid as well as alkaline soils[200]. A twining plant[182]. The leafstalks wrap themselves around twigs and branches for support. When a side of the stalk touches an object, the growth on that side slows down whilst the other side grows at its normal rate - this causes the leaf stalk to entwine the object it is touching[212]. Flowers are produced on the current season's growth, any pruning is best carried out in spring[219]. When planting out, in order to avoid the disease 'clematis wilt', it is best to plant the rootball about 8cm deeper in the soil. This will also serve to build up a good root crown of growth buds[200]. Plants in this genus are notably resistant to honey fungus[200]. Plants seem to be immune to the predations of rabbits[233]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

6.2.365 Cotoneaster franchetii

Orange cotoneaster
5 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 3 m hkuc pcmhmimhtut cyuti kyuctcup hwicli hyishrasjlutnyikfrip hpa7tli flatprikliwisslip hpa7tmwatli xre7t hjonli

drutta Cotoneaster franchetii is an evergreen Shrub growing to 3 m (9ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower in May, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies, midges. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate maritime exposure. It can tolerate atmospheric pollution.

kcakta The fruit has a mild flavour though it is very mealy and full of seeds[K].

tcanta Dye Hedge HedgeA rose-tan dye is obtained from the fruit[168]. The plant can be grown as an informal wind-break hedge in all but the most exposed situations[29, 75, 200]. Tolerates trimming[75].

nrakta E. Asia - W. China to Tibet. ksacta Thickets in rocky sunny mountain regions, open hillsides at elevations of 1600 - 2900 metres[266].

propta Seed. Members of this genus hybridize freely so, if you require seed that breeds true, it is important to obtain it from a known wild source or from a controlled fertilization of garden plants. The seed is best sown as soon as it is ripe in the autumn in a cold frame, when it will usually germinate in the spring[11, 200]. Stored seed germinates faster if given 3 months warm stratification at 15°C and then 3 months cold stratification at 4°C[164]. The seed usually germinates within 1 - 18 months at 15°C but it can take 2 years[164]. Pot the seedlings up as soon as they are large enough to handle and plant them out into nursery beds or into their permanent positions when they are more than 10cm tall. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200].

nwatta An easily grown plant, it prefers a good soil but also does well in poor soils[1, 11, 200]. It thrives in lime and is also happy in peaty soils[1]. It succeeds in any soil that is not marshy or waterlogged[11, 200]. Succeeds in dry soils[188]. Grows well in heavy clay soils. Succeeds in full sun or semi-shade but does not fruit so freely in a shady position[11, 200]. Plants also succeed in deep shade[219]. Tolerates atmospheric pollution[200]. Fairly tolerant of maritime exposure[75, 200]. Plants are hardy to about -15°C[184]. Hybridizes freely with other members of this genus[200]. The flowers, when inhaled near to, have an unpleasant smell like decaying fish[245]. They are very attractive to bees whilst the fruit is a good winter food source for many species of birds[200]. Trees are notably susceptible to honey fungus[200].

6.2.366 Euonymus sachalinensis

Euonymus
5 tlin 8 cyuc 1 kcak 0 tcan 0 dwat 3.5 m hkuc

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

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[177]. The fruit is about 1.5cm in diameter[200].

nrakta E. Asia - China. ksacta Thickets in W. Hupeh, 600 - 1600 metres[109]. Among shrubs, forest margins and thickets at elevations of 100 - 1600 metres[266].

propta Seed - best sown in a cold frame as soon as it is ripe in the autumn, it will then usually germinate in mid to late winter. Stored seed requires 8 - 10 weeks cold stratification at 1°C and should be sown as early in the year as possible[200]. Temperatures over 15 - 20°C induce a secondary dormancy in the seed[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for their first year. Plant them out in late spring or early summer of the following year.

nwatta Prefers a good well-drained loam in full sun[200]. Grows well in heavy clay soils. Tolerates light shade but does not fruit so well in such a position. Tolerates atmospheric pollution, excessive moisture and a range of soil types if they are moderately fertile[200]. Established plants are drought tolerant[200]. Plants are hardy to at least -15°C[200]. A very ornamental tree. This species is closely related to *P. serotina*, differing mainly in having smaller fruit[109].

6.2.344 Catalpa ovata

Chinese Catalpa
5 tlin 9 cyuc 1 kcak 0 tcan 1 dwat 10 m hkuc htut cyuti tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Catalpa ovata is a deciduous Tree growing to 10 m (32ft 10in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from July to August, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. It can tolerate atmospheric pollution.

kcakta Edible Parts: Flowers SeedpodEdible Uses: Flowers and young pods - cooked[183]. They are boiled and washed[179]. (possibly in that order so as to remove any bitterness[K])

dwatta DiureticThe stems are diuretic (strongly)[174, 218].

nrakta E. Asia - C. China. ksacta Open country and margins of woods to 2500 metres[109].

propta Seed - best sown outdoors, or in a cold frame, as soon as it is ripe[200]. Stratify stored seed for 3 weeks at 1°C and sow in spring[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Softwood cuttings, 10cm long, in a frame. They should be taken in late spring to early summer before the leaves are fully developed[200]. Root cuttings in winter[200].

nwatta Landscape Uses:Specimen. Prefers a good moist loamy soil and a sunny position that is not exposed[1, 11]. Tolerates heavy clay soils. Very resistant to atmospheric pollution[188]. Plants are hardy to about -15°C, probably more in continental climates[200], they grow best in areas with hot summers[188]. Protect plants from late frosts when they are young[200]. Transplants easily[200]. The flowers are very fragrant[245]. The bruised foliage has an aromatic fragrance[245]. The flowers are considered to be one of the best bee plants in Japan[245]. Plants in this genus are notably resistant to honey fungus[200]. Special Features:Not North American native, Attractive flowers or blooms.

6.2.345 Phellodendron lavalleyi

Lavalle corktree
5 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 10 m hkuc htut cyuti tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli nyanhjen hjonli

drutta Phellodendron lavalleyi is a deciduous Tree growing to 10 m (32ft 10in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from June to July. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Fruit OilEdible Uses: OilFruit[105, 177]. This use refers to the closely related *P. amurense*, it almost certainly applies to this tree as well[K]. The fruit is about 1cm in diameter and has a strong scent of turpentine, it is produced copiously in Britain[200].

tcanta Cork Dye Insecticide Oil WoodThe bark is thick and corky[200]. Can this be used as a source of cork[K]? The following uses are for the closely related *P. amurense*. They almost certainly also apply to this tree. A yellow dye is obtained from the inner bark[178]. An oil obtained from the seed has insecticidal properties similar to pyrethrum[57]. Wood - heavy, hard, strong, close grained. Used for furniture[74].

nrakta E. Asia - N. and C. Japan. ksacta Woods in mountains[58].

propta Seed - best sown in the autumn in a cold frame[200]. Stored seed requires 2 months cold stratification, sow in late winter in a cold frame[78, 113]. Germination is usually good. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the cold frame for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame. Pot up in autumn and over winter in a cold frame. Fair to good percentage[78]. Root cuttings - obtain in December and store in leafmold in a warm place for 3 weeks. Cut into 4cm lengths and plant horizontally in pots. Grow on in a warm greenhouse. Good percentage[78].

nwatta Prefers a moisture retentive well-drained deep rich loam in an open position in full sun[11, 200]. Grows best in areas with long hot summers[200]. Plants are gross feeders and require a rich soil if they are to perform well[11]. Dormant plants are hardy to at least -20°C, but the young growth is liable to damage from late spring frosts[11, 200]. This species is occasionally cultivated for timber in S.E. Europe[50]. Dioecious. Male and female plants must be grown if seed is required. The fruit is produced copiously on trees in Britain[200].

6.2.346 Picrasma quassioides

Nigaki
5 tlin 9 cyuc 1 kcak 0 tcan 2 dwat 10 m hkuc hmimhtut cyuti tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Picrasma quassioides is a deciduous Tree growing to 10 m (32ft) by 7 m (23ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in May, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Condiment TeaFruit[105, 177]. Small and red[183]. The fruit is a berry about 7mm in diameter[200]. Young buds (the report does not say if they are flower or leaf buds) are used to make a tea[177, 179, 183]. A bitter substance called quassin' is extracted from (the bark of?) the tree and can be used as a hop substitute in brewing beer[183].

tcanta Insecticide Parasiticide WoodThe bark is used as an insecticide[46, 61]. Another report says that it is the wood

that is used[240]. It is a substitute for the insecticide quassia, which is obtained from the wood of a tropical tree[240]. Quassia is a relatively safe organic insecticide that breaks down quickly and is of low toxicity to mammals. It has been used as a parasiticide to get rid of lice, fleas etc. Wood - hard, fine and close grained. Used for mosaic, utensils etc[46, 61, 158].

dwatta Anthelmintic Antiviral Bitter Febrifuge Hypotensive Parasiticide Stomachic TonicThe wood contains a number of medicinal compounds and has been shown to be anthelmintic, antiamoebal, antiviral, bitter, hypotensive and stomachic[279]. It increases the flow of gastric juices[279]. It is used in Korea in the treatment of digestive problems, especially chronic dyspepsia[279]. A decoction of the stem bark is bitter, febrifuge and tonic[46, 61, 146, 158, 174, 218, 240, 272]. The leaves have been used to treat itchy skins[240, 272]. (Probably acting by killing body parasites)[K].

nrakta E. Asia - China, Japan, Korea. ksacta Lowland woods and hills[58]. Forests in the higher hills of the W. Himalayas, in ravines under forests of deodar, oak, fir etc, 1800 - 2400 metres[146].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed requires 3 months cold stratification[113] and should be sown as early in the year as possible. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame[200]. Root cuttings 4cm long in December. Plant them out horizontally in pots in a greenhouse[78].

nwatta Requires a fertile humus-rich moisture-retentive loam in a sunny position[200]. Plants also succeed when growing in semi-shade[188]. According to [200] this plant is only hardy to zone 10 (not tolerating frosts) but there are healthy trees in many parts of Britain including one 8.5 metres tall at Kew in 1981, one 8 metres tall seen growing in light woodland shade at Cambridge Botanical Gardens where it was bearing fruit in the autumn of 1996 and one 9 metres tall at Westonbirt in 1980[11, K].

6.2.347 Euptelea pleiosperma

5 tlin 9 cyuc 1 kcaak 0 tcan 0 dwat 9 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Euptelea pleiosperma is a deciduous Tree growing to 9 m (29ft 6in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in May, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves - cooked. A famine food, used when all else fails[179]. nrakta E. Asia - China, Himalayas. ksacta Thickets and open wood margins, especially near streams in Sichuan[109]. Forests in valleys at elevations of 900 - 3600 metres[266].

propta Seed - best sown as soon as it is ripe in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Layering.

nwatta Prefers an open moderately rich free soil[1] and full sun[200]. Grows well in an open situation in a woodland garden or shrub border[200].

6.2.348 Lonicera affinis

5 tlin 9 cyuc 1 kcaak 0 tcan 1 dwat 7 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Lonicera affinis is an evergreen Climber growing to 7 m (23ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to July. The species is hermaphrodite (has both male and female organs) and is

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

kcakta Edible Parts: Flowers FruitEdible Uses: Fruit[177]. No more details are given. The fruit is about 7mm in diameter[200]. Flowers. Used as a flavouring in drinks[177].

dwatta SkinA tea made from the flowers and leaves is used to treat rashes and boils[218].

nrakta E. Asia - China, C. and S. Japan. ksacta In thickets or edges of forests, mainly in warm coastal areas at elevations of 10 - 800 metres[275].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed requires 2 months cold stratification[113] and should be sown as soon as possible in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm with or without a heel, July/August in a frame. Good percentage[78]. Cuttings of mature wood of the current season's growth, 15 - 20cm with or without a heel, November in a cold frame. Good percentage[78]. Layering in autumn[200].

nwatta Prefers a good moist soil with its roots in the shade and its top growing into the light[200]. A climbing plant, supporting itself by twining around other plants[219].

6.2.349 Cornus occidentalis

Western Dogwood

5 tlin 9 cyuc 1 kcaak 0 tcan 1 dwat 6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Cornus occidentalis is a deciduous Shrub growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177]. They were often eaten by native North Americans, but they are bitter and acid[161, 257].

dwatta OphthalmicThe bitter-tasting bark is astringent, ophthalmic and tonic[118, 257]. An infusion has been used as a wash for sore eyes[257].

nrakta Western N. America. ksacta Moist soils, especially by streams[60].

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

nwatta An easily grown plant, it succeeds in any soil of good or moderate fertility[1], ranging from acid to shallow chalk[200]. Grows well in heavy clay soils. Succeeds in poorly drained soils[200]. Succeeds in full sun or light shade[[188]. Allied to C. stolonifera and considered to be part of that species by some botanists[11, 60, 200]. Plants in this genus are notably resistant to honey fungus[200].

grows at its normal rate - this causes the leaf stalk to entwine the object it is touching[212]. Plants do not generally require pruning, any dead, unwanted or weak shoots are best removed in the winter or early spring[219]. Plants in this genus are notably resistant to honey fungus[200]. Plants seem to be immune to the predations of rabbits[233]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

6.2.361 Viburnum plicatum

Japanese Snowball, Japanese Snowball Viburnum, Doublefile Viburnum

5 tlin 8 cyuc 1 kcaak 0 tcan 0 dwat 4 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli dyatxre7t hjonli

drutta Viburnum plicatum is a deciduous Shrub growing to 4 m (13ft) by 4 m (13ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from June to July, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit - raw or cooked. Young leaves - cooked[177]. Rather unpleasant[K].

nrakta E. Asia - China, Japan. ksacta Thickets in mountains to 1800 metres. C. and S. Japan[58].

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

nwatta Landscape Uses:Border, Massing, Screen, Specimen. An easily grown plant, it succeeds in most soils but is ill-adapted for poor soils and for dry situations[1]. It prefers a deep rich loamy soil in sun or semi-shade[11, 200]. Best if given shade from the early morning sun in spring[200]. A very hardy plant, tolerating temperatures down to about - 25°C. Plants are surface-rooting and are very susceptible to damage by hoeing, drought or water-logging. A section of top growth will often die back if the roots are damaged, in severe cases this will lead to the death of the plant[202]. A very ornamental plant, there are many named varieties[182, 202]. The type species is actually a sterile garden form. The true wild species is often referred to as *V. plicatum tomentosum*. (Thunb.)Miq. Plants take about 5 years from planting out before they produce fruit[202]. Fruit production can be erratic[202]. Plants are self-incompatible and need to grow close to a genetically distinct plant in the same species in order to produce fruit and fertile seed[11, 200]. Special Features:Attractive foliage, Not North American native, Blooms are very showy.

6.2.362 Bryonia alba

White Bryony

5 tlin 9 cyuc 1 kcaak 0 tcan 2 dwat 4 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli prikliwis hpa7tmwatli hjonli

drutta Bryonia alba is a PERENNIAL CLIMBER growing to 4 m (13ft 1in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to June. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All parts of the plant, and especially the root, are poisonous[232]. The root can cause severe diarrhoea and vomiting, resulting in death within a matter of hours[232].

kcakta Edible Parts: LeavesEdible Uses: One report says that the young shoots are edible[2], though caution is advised[K]. See the notes above on toxicity. The starch of the root is a famine food for extending bread flour after removing the acrid element. The young shoots are eaten. Caution: It is probably very poisonous [1b].

dwatta Antirheumatic Homeopathy UrinaryThe root is cathartic, hydrogogue, irritant, pectoral and purgative[4]. The root is harvested in the autumn and can be used either fresh or dried[4]. It should be used with great caution, see notes above on toxicity. The fresh root, gathered before the plant comes into flower, is made into a homeopathic remedy[232]. This is used in the treatment of a wide range of complaints[232]. It is said to be one of the best diuretics and an excellent remedy for gravel as well as all other obstructions and disorders of the urinary passage[4].

nrakta Europe to W. Asia - Iran. ksacta Vineyards and woods[232].

propta Seed - best sown as soon as it is ripe in a cold frame. Sow stored seed in late winter in a cold frame. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter, planting them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in early spring.

nwatta A rapid grower, it is of easy cultivation succeeding in most soils that are well drained[1], avoiding acid soils in the wild[17]. A climbing plant, attaching itself to other plants by means of tendrils[4]. Plants can be easily encouraged by scattering ripe seed at the base of hedgerows[200]. Plants in the north of their range are monoecious, but those growing in the south are dioecious[200]. Where necessary, male and female plants must be grown if seed is required.

6.2.363 Clematis flammula

Fragrant Virgin's Bower, Fragrant clematis

5 tlin 9 cyuc 1 kcaak 0 tcan 0 dwat 4 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwisslip hpa7tmwatli xre7t hjonli

drutta Clematis flammula is a deciduous Climber growing to 4 m (13ft) by 4 m (13ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf from March to December, in flower from August to October, and the seeds ripen from October to January. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

pcista All parts of the plant are poisonous, the toxic principle is dissipated by heat or by drying[65].

kcakta Edible Parts: LeavesEdible Uses: Young shoots - cooked[2, 105, 177]. Some caution is advised due to reports of toxicity[K].

tcanta Plants can be grown as ground cover, planted about 1.2 metres apart and allowed to scramble over the ground[208].

nrakta S. Europe. An infrequent casual in Britain[17]. ksacta Hedges, thickets and waste places[89].

ering of old stems in late winter or early spring[200]. Layering of current seasons growth in early summer[200].

nwatta Prefers a deep moist soil with its roots in the shade and its shoots growing up to the light[164]. Dislikes poorly-drained heavy clay soils, but grows well in clay if grit is added for drainage[11, 200]. Dislikes light sandy soils[11]. Does well on chalk[11]. Succeeds in acid as well as alkaline soils[200]. When planting out, in order to avoid the disease ‘clematis wilt’, it is best to plant the rootball about 8cm deeper in the soil. This will also serve to build up a good root crown of growth buds[200]. A twining plant[182]. The leaf-stalks wrap themselves around twigs and branches for support. When a side of the stalk touches an object, the growth on that side slows down whilst the other side grows at its normal rate - this causes the leaf stalk to entwine the object it is touching[212]. Plants flower in the autumn on the current season’s growth, any pruning is best carried out in the spring before new growth begins[219, 238]. The flowers are produced quite late in the season and can be damaged by late frosts, so plants generally do better in the milder western parts of the country[219]. Plants in this genus are notably resistant to honey fungus[200]. Plants seem to be immune to the predations of rabbits[233]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54]. The flowers are often damaged by winter cold[11].

6.2.358 Weigela decora

5 tlin 9 cyuc 1 kcaak 0 tcan 0 dwat 5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Weigela decora is a deciduous Shrub growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to June. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. It can tolerate atmospheric pollution.

kcaakta Edible Parts: LeavesEdible Uses: Young leaves - cooked[105]. They can be boiled with rice or millet[177].

nrakta E. Asia - C. and S. Japan. ksacta In sunny places at elevations of 100 - 2300 metres[275].

propta Seed - we have no information for this species but suggest sowing the seed in a cold frame as soon as it is ripe if this is possible, otherwise in late winter or early spring. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer. Softwood basal cuttings, 10 - 12cm long, in a sandy soil in a cold frame in early summer[200]. Cuttings of half-ripe wood, 8 - 10 cm with a heel, July/August in a frame[200]. Cuttings of mature wood of the current seasons growth. 20 cm long, November in a sheltered outdoor nursery bed[200].

nwatta An easily grown plant, succeeding in most fertile soils[11, 200]. Prefers a moist well-drained soil in sun or partial shade[200]. Tolerates atmospheric pollution[200]. Plants are very floriferous and can exhaust themselves, literally flowering themselves to death. The flowers are borne in the leaf nodes of the previous years growth and any pruning is therefore best done as soon as the plant has finished flowering[182]. Plants in this genus are notably resistant to honey fungus[200].

6.2.359 Staphylea colchica

Bladdernut

5 tlin 9 cyuc 1 kcaak 0 tcan 1 dwat 4 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Staphylea colchica is a deciduous Shrub growing to 4 m (13ft) by 4 m (13ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to June, and the seeds ripen from September to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can

grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcaakta Edible Parts: Flowers OilEdible Uses: OilFlower buds[74]. No further details are given.

tcanta OilAn oil from the seed tastes like pistachio nuts but is purgative[74]. The report did not say if the oil had other uses.

dwatta PurgativePurgative[74].

nrakta W. Asia - S.W. Caucasus. ksacta Forests to 1200 metres[74, 184].

propta Seed - this can be very slow to germinate, sometimes taking 18 months or more. It is best sown as soon as it is ripe in a cold frame[200], and some of it at least should then germinate in the spring. Stored seed should be sown as early in the year as possible and given cold stratification - it might not germinate until spring of the following year. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in the greenhouse for their first winter. Plant them out early the following summer. Cuttings of half-ripe wood, 5 - 8cm with a heel, July/August in a frame. Fair to good percentage[78]. Layering in July/August. Takes 15 months. Good percentage[78].

nwatta Tolerant of a wide range of soils so long as they are not too dry[182, 200], it prefers a rich loamy soil in full sun or semi-shade[1, 11, 200]. Prefers a neutral to acid soil but tolerates some alkalinity[202]. A very ornamental plant, it is hardy to about -20°C[184]. Fairly fast-growing when young, but slowing with age[202]. Flowers best in years that follow hot summers[200]. Plants in this genus are notably resistant to honey fungus[200].

6.2.360 Clematis patens

5 tlin 9 cyuc 1 kcaak 0 tcan 0 dwat 4 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Clematis patens is a deciduous Climber growing to 4 m (13ft 1in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to July, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no reports of toxicity have been seen for this species, some if not all members of this genus are mildly poisonous. The toxic principle is dissipated by heat or by drying[65].

kcaakta Edible Parts: LeavesEdible Uses: Young shoots - cooked[105, 177]. Some caution is advised, see the notes above on toxicity.

nrakta E. Asia - China, central and southern Japan. ksacta Forests, slopes and scrub at elevations of 200 - 1000 metres in China[266].

propta Seed - best sown as soon as it is ripe in a cold frame[164, 200]. Sow stored seed as soon as it is obtained in a cold frame. Pre-soak the seed for 12 hours in warm water and remove as much of the tail and outer coat as possible[164]. A period of cold stratification is beneficial[164]. The seed germinates in 1 - 9 months or more at 20°C[164]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant out in late spring or early summer, after the last expected frosts. Intermodal cuttings of soft to semi-ripe wood, late spring in sandy soil in a frame[200]. Layering of old stems in late winter or early spring[200]. Layering of current seasons growth in early summer[200].

nwatta Prefers a deep moist soil with its roots in the shade[11, 200]. Dislikes poorly-drained heavy clay soils, but grows well in clay if grit is added for drainage[11, 200]. Dislikes light sandy soils[11]. Does well on chalk[11]. Succeeds in acid as well as alkaline soils[200]. When planting out, in order to avoid the disease ‘clematis wilt’, it is best to plant the rootball about 8cm deeper in the soil. This will also serve to build up a good root crown of growth buds[200]. A twining plant[182]. The leafstalks wrap themselves around twigs and branches for support. When a side of the stalk touches an object, the growth on that side slows down whilst the other side

6.2.350 Acer acuminatum

5 tlin 9 cyuc 1 kcaak 0 tcan 0 dwat 6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli nyanhjen hjonli

drutta Acer acuminatum is a deciduous Tree growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from April to May. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). . The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcaakta Edible Parts: Edible Uses: TeaThe leaves are used as a tea substitute[183].

tcanta Preservative WoodThe leaves are packed around apples, rootcrops etc to help preserve them[18, 20]. Wood - compact, moderately hard. It is seldom used[158].

nrakta E. Asia - W. Himalayas. ksacta Open ravines on shady aspects at altitudes between 2400 - 3300 metres[158].

propta Seed - best sown as soon as it is ripe in a cold frame, it usually germinates in the following spring. Pre-soak stored seed for 24 hours and then stratify for 2 - 4 months at 1 - 8°C. It can be slow to germinate. The seed can be harvested ‘green’ (when it has fully developed but before it has dried and produced any germination inhibitors) and sown immediately. It should germinate in late winter. If the seed is harvested too soon it will produce very weak plants or no plants at all[80, 113]. When large enough to handle, prick the seedlings out into individual pots and grow them on until they are 20cm or more tall before planting them out in their permanent positions. Layering, which takes about 12 months, is successful with most species in this genus. Cuttings of young shoots in June or July. The cuttings should have 2 - 3 pairs of leaves, plus one pair of buds at the base. Remove a very thin slice of bark at the base of the cutting, rooting is improved if a rooting hormone is used. The rooted cuttings must show new growth during the summer before being potted up otherwise they are unlikely to survive the winter. Good results are usually obtained.

nwatta Of easy cultivation, it prefers a good moist well-drained soil[1, 11] in a sunny position but tolerates some shade[11, 200]. Grows well in heavy clay soils. Chlorosis can sometimes develop as a result of iron deficiency when the plants are grown in alkaline soils, but in general maples are not fussy as to soil pH. This species is often confused with *A. papilio*[11]. Most maples are bad companion plants, inhibiting the growth of nearby plants[18, 20]. Dioecious. Male and female plants must be grown if seed is required.

6.2.351 Ptelea baldwinii

Common hoptree

5 tlin 9 cyuc 1 kcaak 0 tcan 0 dwat 6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Ptelea baldwinii is a deciduous Shrub growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from April to May. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcaakta Edible Parts: SeedEdible Uses: Seed. Ground into a powder and mixed with yeast to make a bread[106].

nrakta South-eastern N. America. ksacta Sandy places[72].

propta Seed - best sown as soon as it is ripe in a cold frame[200]. Stored seed requires 3 months cold stratification at 5°C and should be sown as early as possible in the year[113]. Very little of the seed produced in Britain is viable[11]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a greenhouse or cold frame for their first winter. Plant them out in early summer of the following year. Cuttings of half-ripe wood, July/August in a frame[113]. Layering.

nwatta Succeeds in any fertile well-drained moisture retentive soil in full sun or light part day shade[11, 200]. The young growth in spring can be damaged by late frosts. Plants in this genus are notably resistant to honey fungus[200].

6.2.352 Weigela coraensis

5 tlin 9 cyuc 1 kcaak 0 tcan 0 dwat 5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Weigela coraensis is a deciduous Shrub growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in June. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure. It can tolerate atmospheric pollution.

kcaakta Edible Parts: LeavesEdible Uses: Young leaves - cooked[105]. A famine food, they are only used when all else fails[177].

nrakta E. Asia - Japan. ksacta Grows near seashores all over Japan[58].

propta Seed - we have no information for this species but suggest sowing the seed in a cold frame as soon as it is ripe if this is possible, otherwise in late winter or early spring. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer. Softwood basal cuttings, 10 - 12cm long, in a sandy soil in a cold frame in early summer[200]. Cuttings of half-ripe wood, 8 - 10 cm with a heel, July/August in a frame[200]. Cuttings of mature wood of the current seasons growth. 20 cm long, November in a sheltered outdoor nursery bed[200].

nwatta An easily grown plant, succeeding in most fertile soils[11, 200]. Prefers a moist well-drained soil in sun or partial shade[200]. Tolerates atmospheric pollution[200]. Judging by the plants native range, it is likely to succeed in maritime exposure[K]. Plants are very floriferous and can exhaust themselves, literally flowering themselves to death. The flowers are borne in the leaf nodes of the previous years growth and any pruning is therefore best done as soon as the plant has finished flowering[182]. There are some named forms, selected for their ornamental value[200]. Plants in this genus are notably resistant to honey fungus[200].

6.2.353 Forsythia suspensa

Lian Qiao, Weeping forsythia

5 tlin 8 cyuc 1 kcaak 3 tcan 3 dwat 5 m hkuc pcmimhmtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikliwislip hpa7tmwatli dyatxre7t hjonli

drutta Forsythia suspensa is a deciduous Shrub growing to 5 m (16ft) by 5 m (16ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from March to April. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Leaves contain the glycoside Phillyrin[179], its potency is unknown.

kcaakta Edible Parts: LeavesEdible Uses: RutinYoung leaves - cooked[105, 177, 179]. Some caution is advised due to the presence of a glycoside[179]. The leaves are rich in rutin[218].

tcanta The sub-species *F. suspensa sieboldii* is a lax grower that roots freely where the branches touch the ground. It makes a very good tall ground cover when planted about 2.5 metres apart each way[208]. Landscape Uses: Border, Erosion control, Espalier, Massing, Screen.

dwatta Antidote Antiphlogistic Antitussive Cancer Diuretic Emmenagogue Febrifuge Laxative Tonic Urinary VermifugeLian Qiao has been used in Chinese herbalism for over

4,000 years and is considered to be one of the 50 fundamental herbs[218]. A bitter tasting pungent herb with an antiseptic effect, it is chiefly used to treat boils, carbuncles, mumps and infected neck glands[254]. The fruit is a bitter astringent herb that stimulates the heart, nervous system and gall bladder[238]. It contains vitamin P which is used to strengthen capillaries[238]. The fruit is also antidiote, antiphlogistic, antitussive, diuretic, emmenagogue, febrifuge, laxative and tonic[116, 147, 174, 176, 178, 218, 238]. It is used internally in the treatment of acute infectious diseases such as mumps, and also for tonsillitis, urinary tract infections allergic rashes etc[238]. The fruit is harvested when fully ripe and is dried for use in decoctions[238]. The plant has a similar action to *Lonicera japonica* and is usually used in combination with that species to achieve a stronger action[176]. The flowers have a broad-spectrum antibacterial action, inhibiting the growth of *Staphylococcus aureus*, *Shigella dysenteriae*, haemolytic streptococcus, *Pneumococcus*, *Bacillus typhi*, *Mycobacterium tuberculosis* etc[176]. The plant is vermifuge, though the part used is not stated[116, 147, 174, 178]. The leaves are febrifuge and are also poulticed onto ulcerated glands and haemorrhoids[218]. A decoction of the leaves and twigs is used in the treatment of breast cancer[61]. The root is used in the treatment of cancer, colds, fever and jaundice[218].

nrakta E. Asia - E. China. ksacta Thickets, moors and cliffs, 300 - 1200 metres[109]. Thickets or grassy areas on slopes, valleys and gullies at elevations of 300 - 2200 metres[266].

propta Seed - sow spring in a cold frame. The seed usually germinates within 2 months[K]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood 10 - 15cm taken at a node, July/August in a frame. Plant out in autumn or spring. A very high percentage, they root within 3 weeks[78]. Cuttings of mature wood in a sheltered outdoor bed. Good percentage[78]. Layering in spring or summer. Plants often self-layer[K].

nwatta An easily grown plant, it succeeds in all soil types[202] but prefers a rich soil. Succeeds in limey soils. Grows well in heavy clay soils. It prefers a sunny position but succeeds in semi shade though it is apt to get leggy if grown in the shade of trees[182]. Succeeds against a north-facing wall[219]. Plants are hardy to about -25°C[184]. The flowers are produced quite early in the year and are frost-resistant[182]. Plants are medium to fast growing[202]. Flowers are produced on wood that is more than one year old[202]. Any pruning is best done after the plant has finished flowering[182]. A very ornamental plant, there are several named varieties[182]. This species is notably susceptible to honey fungus[200]. Special Features: Not North American native, Blooms are very showy. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fleshy. Thick or swollen - fibrous or tap root [2-1].

6.2.354 *Cotinus coggygria*

Smoke Tree, European smoketree, Venetian Sumac, Wiy Tree, Smoke Tree

5 tlin 8 cyuc 1 kcaak 0 tcan 1 dwat 5 m hkuc hmimhtut cyutli hgaktyctup hwicli hyhrasjnutnyik hpa7tli flatprikliwis hpa7tmwathi nyanhjen hjonli

drutta *Cotinus coggygria* is a deciduous Shrub growing to 5 m (16ft) by 5 m (16ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to July, and the seeds ripen from September to October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). . The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

pista Skin contact with this plant can cause dermatitis in sensitive people[200]. Though related to several poisonous species, this species is definitely not poisonous[65].

ksakta Edible Parts: LeavesEdible Uses: Leaves[2, 179]. They are possibly edible[105, 177]. Some caution is advised. A volatile oil in the leaves contains pinene and camphene[179]. One report suggests that the essential oil contained in the flowers and leaves has a mango-like odour[158]. We have tried these leaves and really would not recommend them to anyone[K].

tcanta Basketry Dye Essential Tannin WoodAn essential oil is obtained from the leaves and flowers[105]. It has a mango-like smell[158]. Is it edible[K]? A yellow to orange dye is obtained from the root and stem[1, 4, 11, 14, 57]. It is somewhat fugitive though[4]. The leaves and bark are a good source of tannins[46, 61, 158]. Wood - ornamental. Used for cabinet making, picture frames[158]. The twigs are used in basketry[158].

dwatta Cholagogue Febrifuge OphthalmicThe yellow wood is used as a cholagogue, febrifuge and for eye ailments[218].

nrakta S. Europe to W. Asia. ksacta Dry hillsides, rocky places and open woods, usually on limestone, to 1300 metres[45, 50, 89].

propta Seed - best sown as soon as it is ripe in a cold frame[78, 113, 200]. It should germinate in the spring. Slightly immature or 'green' seed, harvested when it has fully developed but before it dries on the plant, gives the best results[113]. Warm stratify stored seed for 2 - 3 months at 15°C, then cold stratify for 2 - 3 months[164]. Germination can be very slow, often taking 12 months or more at 15°C[164]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. The seed has a long viability and should store for several years[113]. Cuttings of half-ripe wood, July/August in a frame[113]. Trench layering in spring[200].

nwatta Industrial Crop: Dye Industrial Crop: Tannin Management: Coppice Wild CropLandscape Uses:Border, Container, Massing, Pollard, Screen, Standard, Specimen. Tolerates moist soils[202]. Prefers a well-drained dry or moist soil in a sunny position[108, 200], doing better in a soil that is not very rich[11, 49]. Prefers a fertile but not over-rich soil[188]. Tolerates light shade[188]. Established plants are drought tolerant. Plants are hardy to about -20°C[184], though die-back often occurs at the tips of shoots during the winter[202]. Plants are slow to establish but are then quite fast growing when young though they slow down with age[202]. Hybridizes with *C. obovatus*[182]. A number of cultivars have been developed for their ornamental value[182, 200]. The purple-leafed cultivars are susceptible to mildew[202]. Plants flower on wood that is at least 3 years old[202]. Any pruning is best done in the spring[202]. Branches sometimes wilt, especially after hard pruning, and these should be removed[182]. This species is notably resistant to honey fungus[88, 200]. Dioecious. Male and female plants must be grown if seed is required. Special Features: Not North American native, Attractive flowers or blooms.

6.2.355 *Clematis terniflora*

Senlin-So, Sweet autumn virginsbower, Sweet Autumn Clematis, Fall Clematis

5 tlin 9 cyuc 1 kcaak 1 tcan 1 dwat 5 m hkuc hmimhtut cyutli tcup hwicli hrasjnutnyik hpa7tli flatprikliwissliip hpa7tmwathi xre7t hjonli

drutta *Clematis terniflora* is a PERENNIAL CLIMBER growing to 5 m (16ft 5in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from September to October, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pista Although no reports of toxicity have been seen for this species, some if not all members of this genus are

mildly poisonous. The toxic principle is dissipated by heat or by drying[65].

ksakta Edible Parts: Flowers LeavesEdible Uses: Young shoots - cooked[105, 177]. Parboiled, then eaten boiled or oil-roasted[183]. Some caution is advised, see the notes above on toxicity. The young buds (Does this refer to flower or leaf buds?) are parboiled then eaten boiled or oil-roasted, or they can be pickled in vinegar[183]. Flowers[105, 183]. No more details are given.

tcanta As an ornamental but can be invasive so plant with care. It's a vigorous climber.

dwatta Antidote Antiscrophulatic OphthalmicAntidote, antiscrofulatic, ophthalmic. Used in the treatment of corneal opacities[178].

nrakta E. Asia - China, Japan. ksacta Hedgerows in Kiangsi around 100 metres[109]. Forest margins, scrub on slopes, grassy areas on hills, among rocks in coastal areas; near sea level to 800 metres[266].

propta Seed - best sown as soon as it is ripe in a cold frame[164, 200]. Sow stored seed as soon as it is obtained in a cold frame. Pre-soak the seed for 12 hours in warm water and remove as much of the tail and outer coat as possible[164]. A period of cold stratification is beneficial[164]. The seed germinates in 1 - 9 months or more at 20°C[164]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant out in late spring or early summer, after the last expected frosts. Internodal cuttings of soft to semi-ripe wood, late spring in sandy soil in a frame[200]. Layering of old stems in late winter or early spring[200]. Layering of current seasons growth in early summer[200].

nwatta Landscape Uses:Arbor, Ground cover, Specimen. Prefers a deep moist soil in a sunny position[200]. Dislikes poorly-drained heavy clay soils, but grows well in clay if grit is added for drainage[11, 200]. Dislikes light sandy soils[11]. Does well on chalk[1]. Succeeds in acid as well as alkaline soils[200]. This species has the potential to spread from cultivation in areas where it has been introduced and could become problematic[274]. When planting out, in order to avoid the disease 'clematis wilt', it is best to plant the rootball about 8cm deeper in the soil. This will also serve to build up a good root crown of growth buds[200]. Plants seem to be immune to the predations of rabbits[233]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54]. Special Features:Attractive foliage, Not North American native, All or parts of this plant are poisonous, Fragrant flowers, Attractive flowers or blooms.

6.2.356 *Viburnum cylindricum*

5 tlin 9 cyuc 1 kcaak 0 tcan 1 dwat 5 m hkuc hmimhtut cyutli tcup hwicli hrasjnutnyik hpa7tli flatprikliwis hpa7tmwathi dyatxre7t hjonli

drutta *Viburnum cylindricum* is an evergreen Shrub growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

ksakta Edible Parts: Oil OilEdible Uses: Oil OilAn edible oil is obtained from the seed[105, 146, 158, 179]. It is used for cooking[272].

tcanta Oil WoodAn oil from the seed is used as a luminaant[146]. Wood - hard, close grained[146, 158].

dwatta SkinThe oil from the seed is used to soothe the itchy skin[272].

nrakta E. Asia - China to Burma and the Himalayas. ksacta Rather dry forests, mainly with rhododendron and oak, 1200 - 2400 metres from Himachel Pradesh to S.W. China[51, 146].

propta Seed - best sown in a cold frame as soon as it is ripe. Germination can be slow, sometimes taking more than 18 months. If the seed is harvested 'green' (when it has fully developed but before it has fully ripened) and sown immediately in a cold frame, it should germinate in the spring[80]. Stored seed will require 2 months warm then 3 months cold stratification and can still take 18 months to germinate[113]. Prick out the seedlings into individual pots when they are

large enough to handle and grow them on in a cold frame or greenhouse. Plant out into their permanent positions in late spring or early summer of the following year. Cuttings of soft-wood, early summer in a frame[200]. Pot up into individual pots once they start to root and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, 5 - 8 cm long with a heel if possible, July/August in a frame[78, 113]. Plant them into individual pots as soon as they start to root. These cuttings can be difficult to overwinter, it is best to keep them in a greenhouse or cold frame until the following spring before planting them out[113]. Cuttings of mature wood, winter in a frame. They should root in early spring - pot them up when large enough to handle and plant them out in the summer if sufficient new growth is made, otherwise keep them in a cold frame for the next winter and then plant them out in the spring. Layering of current seasons growth in July/August. Takes 15 months[78].

nwatta An easily grown plant, succeeding in most soils but ill-adapted for poor soils and dry situations[1]. Prefers a deep rich loamy soil in sun or semi-shade[11, 200]. Best if given shade from the early morning sun in spring[200]. Plants are self-incompatible and need to grow close to a genetically distinct plant in the same species in order to produce fruit and fertile seed[11, 200]. The flowers are sweetly scented[245].

6.2.357 *Clematis chinensis*

Wei Ling Xian

5 tlin 9 cyuc 1 kcaak 0 tcan 2 dwat 5 m hkuc hmimhtut cyutli tcup hwicli hrasjnutnyik hpa7tli flatprikliwissliip hpa7tmwathi xre7t hjonli

drutta *Clematis chinensis* is a deciduous Climber growing to 5 m (16ft) by 5 m (16ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from September to October, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pista This species is harmful if eaten[238]. The toxic principle is dissipated by heat or by drying[65]. The plant is also a mild skin irritant[238].

ksakta Edible Parts: LeavesEdible Uses: Young shoots - cooked[179]. They are said to be non-toxic in one report[179] but caution is still advised due to reports of toxicity in this genus[238]. It is quite probable that cooking destroys the acrimonious principle, though this is a plant that I have no desire to eat[K].

dwatta Anodyne Antidote Antiperiodic Antirheumatic Antispasmodic Antitumor Cancer Carminative DiureticThe root is anodyne, antidote, antiperiodic, antispasmodic, carminative, diuretic and sedative[147, 176, 178, 218, 238]. A decoction is taken internally in the treatment of rheumatism and arthritis, tetanus and cold-type stomach-ache[147, 238]. The root is harvested in the autumn and dried for later use[238]. The whole plant is antirheumatic[147, 176, 178, 218]. The plant has a history of folk use in the treatment of cancer[147, 176, 178, 218]. The root contains anemonin, this has antibacterial, analgesic, sedative and antispasmodic actions. It also inhibits the heart and central nervous system and is rubefacient[176].

nrakta E. Asia - C. and W. China. ksacta Open woods, hedges, thickets, roadsides and banks of streams[109, 147, 238].

propta Seed - best sown as soon as it is ripe in a cold frame[164, 200]. Sow stored seed as soon as it is obtained in a cold frame. Pre-soak the seed for 12 hours in warm water and remove as much of the tail and outer coat as possible[164]. A period of cold stratification is beneficial[164]. The seed germinates in 1 - 9 months or more at 20°C[164]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for the first winter. Plant out in late spring or early summer, after the last expected frosts. Internodal cuttings of soft to semi-ripe wood, late spring in sandy soil in a frame[200]. Lay-

forest margins, by streams at elevations of 2200 - 2400 metres[266].

propta Seed - best sown as soon as it is ripe in a cold frame[111]. The seed can be stratified and sown in spring but will then be slow to germinate[133]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer. Division - best done in spring but it can also be done in autumn[1, 111]. Another report says that division is best carried out in the autumn or late winter because the plants come into growth very early in the year[233].

nwatta Thrives in most soils and in the light shade of trees[1]. Grows well in heavy clay soils. Prefers a moist soil in sun or semi-shade[200]. Prefers a calcareous soil. Grows well in open woodlands[1, 4]. Members of this genus seem to be immune to the predations of rabbits and deer[233]. This species is closely related to *A. yezoense*[1]. A greedy plant, inhibiting the growth of nearby species, especially legumes[54].

6.2.502 *Aconitum ferox*

Indian aconite

5 tlin 9 cyuc 0 kcaak 0 tcan 1 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasljutnyikfrp hpa7tli flatprikliwis hpa7tmwatli hjonli

drutta *Aconitum ferox* is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from August to September. The flowers are pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The whole plant is highly toxic - simple skin contact has caused numbness in some people[1, 51, 200].

dwatta Alternative Anaesthetic Antiarthritic Cholera Deobstruent Diaphoretic Diuretic Leprosy Sedative Stimulant-The dried root is alternative, anaesthetic, antiarthritic, deobstruent, diaphoretic, diuretic, sedative, stimulant[178]. It is best harvested in the autumn as soon as the plant dies down. This is a very poisonous plant and should only be used with extreme caution and under the supervision of a qualified practitioner. It has been used in India and Nepal in the treatment of neuralgia, leprosy, fevers, cholera and rheumatism[240, 272]. When the roots are soaked in cow's urine, they become soft and lose their depressant action on the heart, becoming a stimulant instead[240].

nrakta E. Asia - Himalayas. ksacta Shrubberies and forest clearings, 2100 - 3600 metres from C. Nepal to Bhutan[51].

propta Seed - best sown as soon as it is ripe in a cold frame[111]. The seed can be stratified and sown in spring but will then be slow to germinate[133]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer. Division - best done in spring but it can also be done in autumn[1, 111]. Another report says that division is best carried out in the autumn or late winter because the plants come into growth very early in the year[233].

nwatta Thrives in most soils and in the light shade of trees[1]. Grows well in heavy clay soils. Prefers a moist soil in sun or semi-shade[200]. Prefers a calcareous soil. Grows well in open woodlands[1, 4]. The root of this plant is widely collected from the wild for medicinal use and is becoming much rarer in much of its range[272]. Members of this genus seem to be immune to the predations of rabbits and deer[233]. A greedy plant, inhibiting the growth of nearby species, especially legumes[54]. Closely related to *A. napellus*[1].

6.2.503 *Aconitum orientale*

5 tlin 9 cyuc 0 kcaak 0 tcan 1 dwat 1.5 m hkuc

hmimhtut cyutli tcup hwicli hrasljutnyikfrp hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Aconitum orientale* is a PERENNIAL growing to 1.5 m (5ft) by 0.3 m (1ft in). See above for USDA hardiness.

It is hardy to UK zone 6. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The whole plant is highly toxic - simple skin contact has caused numbness in some people[1, 200].

dwatta Anodyne Diaphoretic DiureticThe dried root is anodyne, diaphoretic and diuretic[4]. It should be harvested in the autumn as soon as the plant dies down[4]. This is a very poisonous plant and should only be used with extreme caution and under the supervision of a qualified practitioner.

nrakta W. Asia - Turkey to Iran. ksacta Not known

propta Seed - best sown as soon as it is ripe in a cold frame[111]. The seed can be stratified and sown in spring but will then be slow to germinate[133]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer. Division - best done in spring but it can also be done in autumn[1, 111]. Another report says that division is best carried out in the autumn or late winter because the plants come into growth very early in the year[233].

nwatta Thrives in most soils and in the light shade of trees[1]. Grows well in heavy clay soils. Prefers a moist soil in sun or semi-shade[200]. Prefers a calcareous soil. Grows well in open woodlands[1, 4]. Members of this genus seem to be immune to the predations of rabbits and deer[233]. A greedy plant, inhibiting the growth of nearby species, especially legumes[54].

6.2.504 *Atractylodes macrocephala*

Bai Zhu

5 tlin 9 cyuc 0 kcaak 0 tcan 3 dwat m hkuc

hmimhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli nyanhjen hjonli

drutta *Atractylodes macrocephala* is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August, and the seeds ripen from August to September. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required) . Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

dwatta Antibacterial Diuretic Sedative Stomachic TonicBai Zhu is widely used in traditional Chinese medicine[238]. The root contains an essential oil, glucoside and inulin[283]. It is a bitter-sweet tonic herb that acts mainly upon the digestive system and strengthens the spleen[238, 254]. The root is antibacterial, diuretic, hypoglycaemic, sedative, stomachic and tonic[176, 238]. It is used in the treatment of poor appetite, dyspepsia, abdominal distension, chronic diarrhoea, oedema and spontaneous sweating[176]. It is often used in conjunction with other herbs such as *Codonopsis tangshen* and *Glycyrrhiza uralensis*[238]. Combined with *Baical skullcap* (*Scutellaria baicalensis*) it is used to prevent miscarriage[254]. The roots are harvested in the autumn and baked for use in tonics[238].

nrakta E. Asia - China, Japan and Korea. ksacta Pastures and waste ground[238]. Grassland and forests at elevations of 600 - 2800 metres[266].

propta Seed - sow spring in a cold frame and only just cover the seed. Prick out the seedlings when they are large enough to handle and plant them out into their permanent positions in the following spring or early summer.

nwatta Succeeds in any well-drained soil in sun or partial shade[238]. This species is probably hardy in most of Britain, it tolerates temperatures down to at least -15°C[238]. Widely cultivated in China for its use as a medicinal herb[238, 266]. This species is dioecious. Both male and female plants need to be grown if seed is required[266].

on toxicity.

nrakta E. Asia - Korea. ksacta Open woodland and shrubberies at elevations around 200 metres[273].

propta Seed - best sown as soon as it is ripe in a cold frame[164, 200]. Sow stored seed as soon as it is obtained in a cold frame. Pre-soak the seed for 12 hours in warm water and remove as much of the tail and outer coat as possible[164]. A period of cold stratification is beneficial[164]. The seed germinates in 1 - 9 months or more at 20°C[164]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for the first winter. Plant out in late spring or early summer, after the last expected frosts. Internodal cuttings of soft to semi-ripe wood, late spring in sandy soil in a frame[200]. Layering of old stems in late winter or early spring[200]. Layering of current seasons growth in early summer[200].

nwatta Prefers a deep moist soil with its roots in the shade and its shoots growing up to the light[164]. Dislikes poorly-drained heavy clay soils, but grows well in clay if grit is added for drainage[11, 200]. Dislikes light sandy soils[11]. Does well on chalk[11]. Succeeds in acid as well as alkaline soils[200]. A twining plant[182], the stems will often die right back in the winter[273]. The leafstalks wrap themselves around twigs and branches for support. When a side of the stalk touches an object, the growth on that side slows down whilst the other side grows at its normal rate - this causes the leaf stalk to entwine the object it is touching[212]. Flowers are formed from lateral buds produced the previous season. Any pruning should consist of removing any dead or weak growth in early spring and reducing the remainder down to the strongest pair of lateral buds[273]. Plants in this genus are notably resistant to honey fungus[200]. When planting out, in order to avoid the disease 'clematis wilt', it is best to plant the rootball about 8cm deeper in the soil. This will also serve to build up a good root crown of growth buds[200]. Plants seem to be immune to the predations of rabbits[233]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

6.2.406 *Sabatia angularis*

Bitter Bloom, Rosepink

5 tlin 9 cyuc 1 kcaak 0 tcan 1 dwat 1 m hkuc

hmimhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Sabatia angularis* is a ANNUAL/BIENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Edible Uses: TeaA tonic tea is obtained from the plant[4, 61]. The part of the plant is not specified.

dwatta Antiperiodic TonicAntiperiodic, tonic[4, 61]. Used as a bitter stomachic, similar in its action to *Gentiana lutea*[207]. An infusion of the plant has been used to treat period pains[257].

nrakta Eastern N. America - New York to Ontario, south to Florida and Louisiana. ksacta Rich soils[235] in open woods, clearings, fields and prairies[43].

propta Seed - best sown as soon as it is ripe in late summer or early autumn. Sow in a peaty soil in a moist shady border or sow in pots in a shady part of the cold frame and keep the soil moist by standing the pot in 2 - 3cm of water[1].

nwatta Requires a moist soil[200]. This species provides an excellent cut flower[200].

6.2.407 *Ligusticum mutellina*

Mountain Lovage, Alpine lovage

5 tlin 9 cyuc 1 kcaak 0 tcan 1 dwat m hkuc

htut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli fyixre7t hjonli

drutta *Ligusticum mutellina* is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is

self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: TeaLeaves. Used as a parsley substitute[46, 61, 177]. The dried leaves are a tea substitute[46, 61].

dwatta StomachicStomachic[46, 61].

nrakta Europe. ksacta Mountains, C. and S. Europe[50].

propta The seed is best sown as soon as it is ripe in a cold frame in the autumn. Stored seed should be sown as early in the year as possible in a greenhouse or cold frame[200]. Prick out the seedlings into individual pots when they are large enough to handle and plant them out into their permanent positions in the summer if they have grown large enough. Otherwise, keep them in a cold frame for the first winter and plant them out in early summer. Division in spring.

nwatta Succeeds in any well-drained soil in a sunny position[200].

6.2.408 *Sambucus microbotrys*

Red Elder

5 tlin 9 cyuc 1 kcaak 0 tcan 0 dwat m hkuc

hmimhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Sambucus microbotrys* is a deciduous Shrub growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 6. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

pcista Although no specific mention has been seen for this species, the leaves and stems of some, if not all, members of this genus are poisonous[9, 76]. The fruit of many species (although no records have been seen for this species) has been known to cause stomach upsets to some people. Any toxin the fruit might contain is liable to be of very low toxicity and is destroyed when the fruit is cooked[65, 76].

kcakta Edible Parts: Flowers FruitEdible Uses: Flowers - raw or cooked. Fruit - raw or cooked[177, 257]. The fruit is about 4mm in diameter and is borne in large clusters[200]. Some caution is advised, see the notes above on toxicity.

nrakta South-western N. America. ksacta Moist places, 1800 - 3300 metres in California[71].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame, when it should germinate in early spring. Stored seed can be sown in the spring in a cold frame but will probably germinate better if it is given 2 months warm followed by 2 months cold stratification first[78, 98, 113]. Prick out the seedlings into individual pots when they are large enough to handle. If good growth is made, the young plants can be placed in their permanent positions during the early summer. Otherwise, either put them in a sheltered nursery bed, or keep them in their pots in a sheltered position and plant them out in spring of the following year. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame[78]. Cuttings of mature wood of the current season's growth, 15 - 20cm with a heel, late autumn in a frame or a sheltered outdoor bed[78].

nwatta Tolerates most soils, including chalk[200], but prefers a moist loamy soil[11, 200]. Grows well in heavy clay soils. Tolerates some shade but is best in a sunny position[1]. Tolerates atmospheric pollution and coastal situations[200]. Plants in this genus are notably resistant to honey fungus[200].

6.2.409 *Antirrhinum majus*

Snapdragon, Garden snapdragon

5 tlin 10 cyuc 1 kcaak 2 tcan 1 dwat m hkuc

hmimhtut cyutli kyuctup hwicli hyishrasljutnyikfrp hpa7tli flatprikliwis hpa7tmwatli fyixre7t hjonli

drutta *Antirrhinum majus* is a PERENNIAL growing to 1 m (3ft 3in) by 0.2 m (0ft 8in) at a medium rate. See above

for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

ksakta Edible Parts: OilEdible Uses: OilAn oil that is little inferior to olive oil is said to be obtained from the seeds[4]. The report also says that the plant has been cultivated in Russia for this purpose[4]. The seeds are very small and I wonder about the authenticity of this report[K].

tcanta Dye OilA green dye is obtained from the flowers, it does not require a mordant[168]. Dark green and gold can also be obtained if a mordant is used[168].

dwatta Antiphlogistic Bitter Resolvent StimulantThe leaves and flowers are antiphlogistic, bitter, resolvent and stimulant[7, 115]. They have been employed in poultices on tumours and ulcers[4]. It is effective in the treatment of all kinds of inflammation and is also used on haemorrhoids[7]. The plant is harvested in the summer when in flower and is dried for later use[7].

nrakta Europe. Naturalized in Britain[17]. **ksakta** Old walls, rocks and dry places[17, 100].

propta Seed - surface sow March in a greenhouse. The seed usually germinates in 10 - 21 days at 18°C[134]. Cool nights assist germination[134]. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. The seed can also be sown in situ in July/August and will produce larger and more floriferous plants the following summer. Cuttings of half-ripe wood in September in a cold frame[200].

nwatta Landscape Uses:Border, Container, Foundation, Massing, Specimen, Woodland garden. Prefers a light well drained loam and a sunny position[1, 200]. Plants are tolerant of clay and lime soils, and also grow well on old walls[200]. Plants are often grown as an annual since they usually degenerate in their second year[1]. They often self sow when well-sited[K]. There are many named forms, selected for their ornamental value[200]. **Special Features:**Not North American native, Naturalizing, Attracts butterflies, Suitable for cut flowers, Suitable for dried flowers, Fragrant flowers.

6.2.410 Rumex hydrolapathum

Great Water Dock

5 tlin 9 cyuc 1 kcaak 0 tcan 1 dwat 1.8 m hkuc hmimhtut cyutli tcuphja7nh6s hwicli hrasljutnyik hpa7tli prikliw hpa7tmwatli xre7t hjonli

drutta Rumex hydrolapathum is a PERENNIAL growing to 1.8 m (6ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from July to September, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can grow in water.

pcista Plants can contain quite high levels of oxalic acid, which is what gives the leaves of many members of this genus an acid-lemon flavour. Perfectly alright in small quantities, the leaves should not be eaten in large amounts since the oxalic acid can lock-up other nutrients in the food, especially calcium, thus causing mineral deficiencies. The oxalic acid content will be reduced if the plant is cooked. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

ksakta Edible Parts: Leaves SeedEdible Uses: Young leaves - cooked[2, 105, 183]. Seed - raw or cooked. It can be ground into a powder and used as a flour[102]. The seed is small and rather fiddly to harvest.

tcanta Dye TanninTeethThe roots contain tannin. In cultivated plants, those grown on dry land contained 6 - 8% tannin whilst those grown in water contained 12.4 - 21.6%[223]. The dried and powdered root makes a good tooth cleaner[4].

Dark green to brown and dark grey dyes can be obtained from the roots of many species in this genus. They do not need a mordant[168].

dwatta Antiscorbutic Astringent OphthalmicThe root is antiscorbutic and strongly astringent[4]. It is harvested in early spring and dried for later use[4]. The green leaves are said to be an excellent application for ulcers of the eyes[4].

nrakta Western Europe, including Britain, from Scandinavia south and east to Spain, Italy and S. Russia. **ksakta** Near ponds and streams, also in shallow water, avoiding acid conditions[17].

propta Seed - sow spring in situ. Division in spring.

nwatta Requires a moist or wet soil, also succeeding in shallow water. Avoids acid conditions in the wild. A very important food plant for the caterpillars of many species of butterfly[30].

6.2.411 Paeonia delavayi

Tree Peony, Dian mu dan

5 tlin 9 cyuc 1 kcaak 0 tcan 3 dwat 1.6 m hkuc hmimhtut cyutli tcup hwicli hrasljutnyikfrip hpa7tli flatprikli-wisslip hpa7tmwatli fyfjxre7t hjonli

drutta Paeonia delavayi is a deciduous Shrub growing to 1.6 m (5ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

ksakta Edible Parts: FlowersEdible Uses: The following use is for *P. suffruticosa*. It quite probably also applies to this closely-related species.[K - see 214]. Flowers - cooked[46, 61, 177]. The fallen flower petals are parboiled and sweetened for a teatime delicacy, or can be cooked in various dishes[183].

dwatta Analgesic Antibacterial Antiinflammatory Antispasmodic Cholera DysenteryThe bark obtained from the root has an antimicrobial effect upon various bacteria, including *Escherichia coli*, typhoid, cholera, *Staphylococcus aureus*, streptococcus hemolyticus and *Pneumococci*[200]. The root is also anti-inflammatory and has been used with success in the treatment of arthritic joint swelling[250]. The root is also analgesic, sedative and anticonvulsant, it has a high success rate in the treatment of dysentery and can also be used to treat allergic rhinitis[250]. The plant is used internally in the treatment of fevers, boils, menstrual disorders, nosebleeds, ulcers, irritability and gastro-intestinal infections[238]. This remedy should only be used under the supervision of a qualified practitioner[238]. The herb acts as a synergist when used with liquorice (*Glycyrrhiza* spp)[218]. A tea made from the dried crushed petals of various peony species has been used as a cough remedy, and as a treatment for haemorrhoids and varicose veins[250].

nrakta E. Asia - China in Yunnan and Likiang. **ksakta** Shady, moist areas of pine forests, in forest clearings and among scrub at altitudes of between 3,050 - 3,650 metres[250].

propta Seed - best sown as soon as it is ripe in a cold frame[250]. When sown fresh, the seed produces a root about 6 weeks after sowing with shoots formed in the spring[200]. Stored seed is much slower, it should be sown as soon as possible in a cold frame but may take 18 months or more to germinate[200]. The roots are very sensitive to disturbance, so many growers allow the seedlings to remain in their pots for 2 growing seasons before potting them up. This allows a better root system to develop that is more resilient to disturbance[250]. If following this practice, make sure you sow the seed thinly, and give regular liquid feeds in the growing season to ensure the plants are well fed. We usually prick out the seedlings into individual pots as soon as they are large enough to handle, and then grow them on in a cold frame for at least two growing seasons before planting them out when they are in growth in the spring[K].

nwatta An easily grown and undemanding plant[250], it prefers a deep rich soil, preferably neutral or slightly alkaline[1], doing quite well in sun or light shade[1]. Prefers a limy soil and a sheltered position[200]. Grows well in heavy

6.2.498 Scrophularia ningpoensis

5 tlin 9 cyuc 0 kcaak 0 tcan 3 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikliw hpa7tmwatli xre7t hjonli

drutta Scrophularia ningpoensis is a PERENNIAL growing to 1 m (3ft 3in) by 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to October, and the seeds ripen from September to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

dwatta Antibacterial Antifungal Antiphlogistic Antipyretic Cardiac Diuretic Febrifuge Haemolytic Hypoglycaemic Restorative Sialagogue Tonic VasodilatorThis species has been used in Chinese herbal medicine for over 2,000 years[238]. The root is antibacterial, antifungal, antipyretic, antiphlogistic, cardiac, diuretic, febrifuge, haemolytic, hypoglycaemic, restorative, sialagogue, tonic and vasodilator[147, 176, 218]. Small doses act as a heart tonic, whilst large doses depress cardiac function[176, 238]. The root is used internally in the treatment of feverish illnesses with symptoms such as rashes, delirium and insomnia, dry cough, throat infections, abscesses and carbuncles[238]. The root is harvested in the autumn and dried for later use[238].

nrakta E. Asia - China. **ksakta** Gullies, thickets and wet waste places along the edges of rivers and streams[147]. Bamboo forests, along streams, thickets, tall grasses; below 1500 metres[266].

propta Seed - sow spring or autumn in a cold frame[238]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Succeeds in most moist to wet soils in full sun or partial shade[200, 238]. This species is hardy to at least -15°C[238].

6.2.499 Aristolochia macrophylla

Pipevine, Dutchman's Pipe

5 tlin 8 cyuc 0 kcaak 0 tcan 1 dwat m hkuc hmimhtut cyutli kyucctup hwicli hrasljutnyik hpa7tli flatprikliw hpa7tmwatli xre7t hjonli

drutta Aristolochia macrophylla is a CLIMBER growing to 7 m (23ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to August, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista We have no specific details for this species but most members of this genus have poisonous roots and stems[179]. The plant contains aristolochic acid, this has received rather mixed reports on its toxicity. According to one report aristolochic acid stimulates white blood cell activity and speeds the healing of wounds, but is also carcinogenic and damaging to the kidneys[254]. Another report says that it is an active antitumour agent but is too toxic for clinical use[218]. Another report says that aristolochic acid has anti-cancer properties and can be used in conjunction with chemotherapy and radiotherapy and that it also increases the cellular immunity and phagocytosis function of the phagocytic cells[176].

dwatta Antiseptic AntitumorThe plant contains the antiseptic and antitumor compound aristolochic acid[222]. A decoction of the root has been used externally to treat 'swelling of feet and legs'[257]. A compound infusion of stalk chips has been used in the treatment of 'yellowish urine'[257].

nrakta Eastern N. America - Pennsylvania to Minnesota, Georgia, Tennessee and Kansas. **ksakta** Moist, rich woodlands[200, 235]. Forests, often on dissected uplands and

rugged, rocky slopes; Cumberland and Blue Ridge mountains at elevations of 50 - 1300 metres[270].

propta Seed - best sown in a greenhouse as soon as it is ripe in the autumn. Pre-soak stored seed for 48 hours in hand-hot water and surface sow in a greenhouse[134]. Germination usually takes place within 1 - 3 months at 20°C[134]. Stored seed germinates better if it is given 3 months cold stratification at 5°C[200]. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant out in late spring or early summer after the last expected frosts. Division in autumn[200]. Root cuttings in winter[200].

nwatta Landscape Uses:Arbor, Screen. Prefers a well-drained loamy soil, rich in organic matter, in sun or semi-shade[1, 200], but succeeds in ordinary garden soil[134]. Plants are hardy to at least -10°C[200]. A fast-growing climbing plant, attaching itself by means of twining around other plants, it has been recommended for covering pergolas[200]. Most species in this genus have malodorous flowers that are pollinated by flies[200]. **Special Features:**Attracts birds, Attractive foliage, North American native, All or parts of this plant are poisonous, Attracts butterflies, Attractive flowers or blooms.

6.2.500 Peucedanum cervaria

5 tlin 9 cyuc 0 kcaak 0 tcan 1 dwat 1.5 m hkuc htut cyutli tcup hwicli hrasljutnyik hpa7tli flatprikliw hpa7tmwatli fyfjxre7t hjonli

drutta Peucedanum cervaria is a PERENNIAL growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 6. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista Although no mention of toxicity has been seen for this species, skin contact with the sap of a number of members in this genus is said to cause photo-sensitivity and/or dermatitis in some people[65, 218]. They are also said to contain the alleged 'psychotroph' myristicine[218].

dwatta Diuretic Emmenagogue Febrifuge StomachicDiuretic, emmenagogue, febrifuge, stomachic[61].

nrakta C. and S. Europe. **ksakta** Not known

propta Seed - we have no information on this species but suggest sowing the seed in a cold frame as soon as it is ripe if this is possible otherwise in early spring. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer.

nwatta An easily grown plant, it succeeds in any moisture-retentive soil in a sunny position[200]. Suitable for group plantings in the wild garden[200]. This species was formerly cultivated as a medicinal plant[61].

6.2.501 Aconitum kusnezoffii

Bei Wu Tou

5 tlin 9 cyuc 0 kcaak 0 tcan 1 dwat 1.5 m hkuc hmimhtut cyutli tcup hwicli hrasljutnyikfrip hpa7tli flatprikliw hpa7tmwatli hjonli

drutta Aconitum kusnezoffii is a PERENNIAL growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to September. The flowers are pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The whole plant is highly toxic - simple skin contact has caused numbness in some people[1].

dwatta Alterative Anaesthetic Antiarthritic Deobstruent Diaphoretic Diuretic Sedative StimulantThe root is alterative, anaesthetic, antiarthritic, deobstruent, diaphoretic, diuretic, sedative and stimulant[178]. This is a very poisonous plant and should only be used with extreme caution and under the supervision of a qualified practitioner.

nrakta E. Asia - N. China, N. Japan in Kamtschatka, Korea and Siberia. **ksakta** Grassy slopes, grasslands, forests,

spring[200] Careful division of old suckering shrubs in the dormant season.

nwatta Landscape Uses:Border, Erosion control, Ground cover, Massing, Rock garden. Easily grown in any reasonably good well-drained but moisture retentive soil[1]. Tolerates a wide range of pH[186]. Succeeds in sun or semi-shade[1] but flowers better in a sunny position[200]. Succeeds in dry shade and is drought tolerant when established[190]. Hardy to about -20°c, but if cut back by cold weather plants can re-sprout from the base[184]. Plants often self-sow freely[208]. A number of named forms have been developed for their ornamental value[182]. Plants in this genus are notably resistant to honey fungus[200]. The leaves are covered in pellucid dots which, when touched, release a resinous smell somewhat like goats[245]. Special Features: Attractive foliage, Naturalizing, Attracts butterflies, Attractive flowers or blooms

6.2.495 Aconitum uncinatum

Wild Monkshood, Southern blue monkshood
5 tlin 9 cyuc 0 kcaak 0 tcan 1 dwat 1 m hkuc
hmmihtut cyutli tcup hwicli hrasljutnyikfrip hpa7tli flatprikliwis hpa7tmwatli hjonli

drutta Aconitum uncinatum is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August. The flowers are pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The whole plant is highly toxic - simple skin contact has caused numbness in some people[1].

dwatta Alterative Anaesthetic Antiarthritic Deobstruent Diaphoretic Diuretic Sedative StimulantThe dried root is alterative, anaesthetic, antiarthritic, deobstruent, diaphoretic, diuretic, sedative, stimulant[178]. It is harvested as soon as the plant dies down in the autumn. This is a very poisonous plant and should only be used with extreme caution and under the supervision of a qualified practitioner. A tincture is used as an external anaesthetic[207].

nrakta Eastern N. America - Pennsylvania to Indiana and south to Alabama and Georgia. ksacta Low woods and damp slopes[43]. Wet areas along streams and in springs, also less mesic locations in woods and clearings at elevations of 200 - 2000 metres[270].

propta Seed - best sown as soon as it is ripe in a cold frame[111]. The seed can be stratified and sown in spring but will then be slow to germinate[133]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer. Division - best done in spring but it can also be done in autumn[1, 111]. Another report says that division is best carried out in the autumn or late winter because the plants come into growth very early in the year[233].

nwatta Thrives in most soils and in the light shade of trees[1]. Grows well in heavy clay soils. Prefers a moist soil in sun or semi-shade[200]. Prefers a calcareous soil. Members of this genus seem to be immune to the predations of rabbits and deer[233]. Grows well in open woodlands[1, 4]. A greedy plant, inhibiting the growth of nearby species, especially legumes[54].

6.2.496 Opopanax chironium

Opopanax
5 tlin 9 cyuc 0 kcaak 0 tcan 1 dwat 1.8 m hkuc
htut cyutli kyucutcup hwicli hrasljutnyik hpa7tli flatprikliwis hpa7tmwatli fyfjxre7t hjonli

drutta Opopanax chironium is a PERENNIAL growing to 1.8 m (6ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf from October to August, in flower from June to July, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly

acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

tcanta GumA gum is obtained through incisions in the roots at the base of the stems[4]. It is used in perfumery[1, 46, 61] and also in medicines[171]. The gum is inflammable, burning brightly[4].

dwatta Antispasmodic DeobstruentThe gum (an oleo resin according to one report) that is obtained from the base of the stems is antispasmodic and deobstruent[4]. It is nowadays considered to be a medium of feeble powers though it was at one time widely used in the treatment of menstrual disorders, asthma, chronic visceral afflictions etc[4].

nrakta S. Europe. ksacta Stony ground, olive groves, vineyards etc[45].

propta Seed - sow spring in situ. If seed is in short supply then it is best to sow it in a pot in the greenhouse in early spring. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in early summer.

nwatta An easily grown plant, it succeeds in any good garden soil[1]. It can tolerate very considerable neglect, some plants we were growing were left to fend for themselves in very dense weed growth and survived well for 8 years before being moved to another site[K]. We are not sure how hardy this plant is, but the foliage has withstood short periods of temperatures down to -6°c with us[K]. A warm climate is necessary in order to produce good quality gum[4]. Plants seem to be very tolerant of root disturbance, specimens that had been growing for 4 years in one site grew away very well when transplanted as they came into growth in late autumn[K].

6.2.497 Solidago gigantea

Giant Goldenrod
5 tlin 9 cyuc 0 kcaak 0 tcan 2 dwat 1.2 m hkuc
hmmihtut cyutli tcup hwicli hrasljutnyikfrip hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Solidago gigantea is a PERENNIAL growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

tcanta BasketryThe stems can be made into rough baskets[257].

dwatta Astringent Cathartic Diuretic Febrifuge StypticThe leaves and blossoms are astringent, cathartic and styptic[4]. They are a valuable remedy in the treatment of all kinds of haemorrhages[4]. An infusion of the blossoms has been used to treat various fevers[257]. An oil obtained from the plant (is this an essential oil?) is diuretic[4].

nrakta N. America - New Brunswick to British Columbia, south to Georgia, Texas and Utah. ksacta Low wet areas, roadsides, pond margins and the sides of streams, generally in mesic areas[274].

propta Seed - sow spring in a cold frame. Only just cover the seed and do not allow the compost to become dry. Prick out the seedlings into individual pots when they are large enough to handle, and grow them on for their first winter in pots. Plant them out into their permanent positions in spring or early summer. Division in spring or autumn. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Succeeds in only moderately fertile moisture retentive soil in sun or semi-shade[200]. Grows well in heavy clay soils. A rather greedy plant, it is apt to impoverish the soil[1]. This species has become a weed in its native range, increasing freely by seed and at the root[200]. The plant attracts various beneficial insects such as ladybirds, lacewings and hoverflies to the garden, these insects will help to control insect pests in the garden[201, 238].

clay soils and on chalk[184].Plants are tolerant of a wide range of soil conditions, but will not survive if the soil becomes waterlogged or is too dry[250]. Plants grown on sandy soils tend to produce more leaves and less flowers, whilst those growing on clay take longer to become established but produce better blooms[250]. Hardy to about -20°c[184], plants do better in the north of Britain than they do in the south and are generally best if given an open northerly aspect[11]. A very ornamental and long-lived plant[1], it grows rapidly and produces lots of lateral shoots[250]. It grows best in areas with long hot summers[1] and requires an airy position because it is very subject to fungal attack[11]. Plants in this genus are notably susceptible to honey fungus[200]. This species comes into growth early in the year but unlike P. suffruticosa it does not seem to be subject to damage by late frosts[11]. It is probably best still given a position sheltered from the early morning sun. The branches are brittle and very subject to wind damage, especially when young[200]. This species is closely related to P. lutea[11]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. A very greedy plant inhibiting the growth of nearby plants, especially legumes. The plant does not really need much pruning apart from removing dead or diseased stems. It is, however, very tolerant of pruning and can be cut right back to ground level if it requires rejuvenation[200]. Strongly resents root disturbance, taking some time to recover after being divided[1]. Peony species are usually self-fertile, though they will also hybridise with other species if these flower nearby at the same time[250]. This species will often self-sow freely when well sited[250]. Plants take 4 - 5 years to flower from seed[200]. They generally breed true from seed[1]. Cultivated in China as a medicinal plant[214].

6.2.412 Lolium perenne

Perennial Ryegrass, Italian ryegrass, Darnel, Lyme Grass, Terrell Grass, English Ryegrass, Strand Wk
5 tlin 7 cyuc 1 kcaak 0 tcan 1 dwat 1 m hkuc
htut cyutli hgattcup hwicli hrasljutnyik hpa7tli frusflatprikliwissliphsom hpa7tmwatli xre7t hjonli

drutta Lolium perenne is an evergreen Perennial growing to 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf all year. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid, very alkaline and saline soils. It cannot grow in the shade. It prefers moist soil and can tolerate drought. It can tolerate atmospheric pollution.

kcakta Edible Parts: SeedEdible Uses: Seed - cooked. Used as a cereal[177]. The seed has a nutritional value similar to oats (Avena sativa) and contain gluten[269]. An emergency food, it is only used when all else fails[177]. The seed is rather small and fiddly to use[K]. Yields of 1 tonne per hectare have been achieved, though around 500kg is a more common yield[269].

tcanta BiomassThe plant has the potential to be used as a source of biomass. Yields of up to 25 tonnes per hectare have been reported from Europe. In the absence of definitive yield information an average yield of 17.5 tonnes of dry matter per hectare per year and an energy content of 17.5 GJ per metric tonne are assumed[269].

dwatta Astringent Cancer MalariaThe plant has occasionally been used in the treatment of cancer, diarrhoea, haemorrhages and malaria[269].

nrakta Europe to E. Asia. ksacta Meadows and weedy places[74].

propta Seed - sow in situ in the spring. It is also possible to sow the seed in situ in the autumn in most parts of Britain. This will give larger plants and heavier yields.

nwatta Landscape Uses:Erosion control, Ground cover. Adapted to mild, humid temperate climates, this species grows best on rather heavy, rich, moist soils, but also does well on well-manured lighter soils with sufficient moisture[269]. It dislikes shade and requires a well-drained soil[200]. It prefers a pH in the range 6 - 7, though it can tolerate a range from 4.5 - 8.2[269]. Plants are moderately drought resistant, they tolerate atmospheric pollution and salt

in the soil, and can also succeed when planted on mine-spoil[269]. They prefer an annual precipitation in the range of 21 - 176cm[269]. Many cultivars have been developed by selection of individual plants, clones and families for specific purposes, such as for lawns, pastures and hay[269]. A fast growing plant, it combines particularly well with white clover (Trifolium repens)[269]. Special Features: Not North American native, Naturalizing.

6.2.413 Aconitum heterophyllum

5 tlin 9 cyuc 1 kcaak 0 tcan 2 dwat 1.5 m hkuc
hmmihtut cyutli tcup hwicli hrasljutnyikfrip hpa7tli flatprikliwis hpa7tmwatli hjonli

drutta Aconitum heterophyllum is a PERENNIAL growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from August to September, and the seeds ripen from September to October. The flowers are pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The whole plant is highly toxic - simple skin contact has caused numbness in some people[1]. One report says that this plant does not contain the toxic alkaloid aconitine, and so is not poisonous[4]. It does, however, still contain an intensely bitter alkaloid[4].

kcakta Edible Parts: Leaves RootEdible Uses: Leaves and root - cooked[177]. This report should be treated with great distrust due to the poisonous nature of the genus, but see the notes above on known hazards[K].

dwatta Analgesic Antiinflammatory Antiperiodic Aphrodisiac Astringent Cholagogue Febrifuge TonicThe dried root is analgesic, anti-inflammatory, antiperiodic, aphrodisiac, astringent, cholagogue, febrifuge and tonic[4, 240]. It is used in India in the treatment of dyspepsia, diarrhoea and coughs[240, 243]. It is also used in Tibetan medicine, where it is said to have a bitter taste and a cooling potency[241]. It is used to treat poisoning from scorpion or snake bites, the fevers of contagious diseases and inflammation of the intestines[241]. The root is best harvested in the autumn as soon as the plant dies down and is dried for later use[4]. This is a very poisonous plant and should only be used with extreme caution and under the supervision of a qualified practitioner.

nrakta E. Asia - W. Himalayas. ksacta Usually found on humus-rich soils in the alpine and subalpine zones, and in forests, 2300 - 2900 metres[145, 243].

propta Seed - best sown as soon as it is ripe in a cold frame[111]. The seed can be stratified and sown in spring but will then be slow to germinate[133]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer. Division - best done in spring but it can also be done in autumn[1, 111]. Another report says that division is best carried out in the autumn or late winter because the plants come into growth very early in the year[233].

nwatta Thrives in most soils and in the light shade of trees[1]. Grows well in heavy clay soils. Prefers a moist soil in sun or semi-shade[200]. Prefers a calcareous soil. Grows well in open woodlands[1, 4]. The roots of this plant are extensively collected from the wild for medicinal use and the species is becoming much rarer in many areas of its range[272]. Members of this genus seem to be immune to the predations of rabbits and deer[233]. A greedy plant, inhibiting the growth of nearby species, especially legumes[54].

6.2.414 Leucocrinum montanum

Sand Lily, Common starlily
5 tlin 9 cyuc 1 kcaak 0 tcan 1 dwat m hkuc
htut cyutli tcup hwicli hrasljutnyik hpa7tli lwisslip hpa7tmwatli xre7t hjonli

drutta Leucocrinum montanum is a PERENNIAL growing to 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to June. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay)

soils and prefers well-drained soil. Suitable pH: basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Root[105, 161, 257]. No more details are given.

dwatta PoultriceA poultice of the pulverized roots has been applied to sores and swellings[257].

nrakta South-western N. America - Oregon to California. ksacta Sagebrush desert to open montane forest in sandy to rocky areas in fairly heavy soils that are not swampy[60].

propta Seed - we have no details for this species but suggest sowing the seed in a greenhouse as soon as it is ripe if possible otherwise in early spring. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts.

nwatta Requires a sunny position in a well-drained but moisture-retentive alkaline soil[200]. Tolerates temperatures down to about -20°C[200].

6.2.415 *Filipendula multijuga*

5 tlin 9 cyuc 1 kcak 0 tcan 0 dwat m hkuc hmimhtut cyutli tucpja7n hwicli hrasjlutnyikfrip hpa7tli prikrlwis hpa7tmwatli fyfjre7t hjonli

drutta Filipendula multijuga is a PERENNIAL growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: LeavesEdible Uses: Young shoot tips - cooked[116].

nrakta E. Asia - Japan. ksacta Mountains, C. and S. Japan[58].

propta Seed - best sown in the autumn in a cold frame[1]. The seed can also be sown in a cold frame in spring, germinating best at a temperature of 10 - 13°C[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer if they have grown enough. If not, keep them in a cold frame for the winter and plant them out in late spring. Division in autumn or winter[200]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Requires a humus-rich moist soil in semi-shade[200]. Succeeds in full sun only if the soil is reliably moist throughout the growing season[200]. Dislikes dry or acid soils. Does well in marshy soils. Grows well in heavy clay soils. A very ornamental plant[116]. The flowers are very attractive to bees. Members of this genus are rarely if ever troubled by browsing deer[233].

6.2.416 *Euphorbia lathyris*

Caper Spurge, Moleplant

5 tlin 9 cyuc 1 kcak 3 tcan 2 dwat 1 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flat-prikrlwis hpa7tmwatli hjonli

drutta Euphorbia lathyris is a ANNUAL/BIENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to June, and the seeds ripen from July to August. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista The sap contains a latex which is toxic on ingestion and highly irritant externally, causing photosensitive skin reactions and severe inflammation, especially on contact with eyes or open cuts. The toxicity can remain high even

in dried plant material[200]. Prolonged and regular contact with the sap is inadvisable because of its carcinogenic nature[214]. The seed is also poisonous[76].

kcakta Edible Parts: Oil SeedEdible Uses: OilThe seed has been used as a substitute for capers. It is very acrid and requires long steeping in salt and water, and afterwards in vinegar[2]. Great caution is advised, see the notes above on toxicity.

tcanta Biomass Latex Oil RepellentA fine clear oil is obtained from the seed[4, 74]. Yields of 42% have been obtained[240]. The oil rapidly goes rancid and acquires a dangerous acrimony[4]. It is a violent poison, producing violent purging and irritation to the intestines[4]. It can be used medicinally when fresh[4]. A latex in the leaves can be converted into vehicle fuel[160]. Reports suggest potential yields of fuel ranging from 5 to 125 barrels per hectare[218]. The growing plant is said to repel mice and moles, this is said to be most effective in its second year of growth though lots of reports cast doubt on this ability[18, 21, 54, 160]. Dynamic accumulator.

dwatta Abortifacient Antiseptic Cancer Diuretic Emetic Purgative WartsCaper spurge was used in the past as a violent purgative, whilst the rubefacient action of the leaves was employed by beggars to raise unsightly sores on their skins to elicit pity and thereby obtain more money[254]. All parts of the plant are emetic and purgative[4, 7, 21] and the plant is nowadays considered to be far too toxic for it to be used medicinally[238]. The latex in the stems has been used externally as a depilatory and to remove corns, but it is too irritant to be used safely[7, 254]. The seed is diuretic, parasiticide and purgative[176, 218]. It has been used in the treatment of dropsy, oedema, tumours, amenorrhoea, schistosomiasis, scabies and snake bites[176, 240]. The fresh seed has an antitumor action, effective against acute lymphocytic and granulocytic leukaemia[176]. The plant has anticancer activity[218]. It is also antiseptic, cathartic, emetic and purgative[218]. Use the plant with caution[4, 7, 21]. One seed capsule is said to cause catharsis, several to cause an abortion[207].

nrakta Europe. Possibly native to Britain but more common as a garden escape. ksacta Woods, avoiding acid soils[17].

propta Seed - sow spring in situ. Germination usually takes place within 2 - 3 weeks at 20°C.

nwatta Prefers a light well-drained soil in an open position[200]. Prefers a dry soil but grows almost anywhere[1]. Often self-sows freely[1, 17]. Formerly cultivated for its fruit[17] - for the oil contained in the fruit according to another report[74]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. This genus has been singled out as a potential source of latex (for making rubber) for the temperate zone, though no individual species has been singled out[141].

6.2.417 *Spiraea alba*

White Meadowsweet

5 tlin 9 cyuc 1 kcak 0 tcan 1 dwat 1.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikrlwis hpa7tmwatli xre7t hjonli

drutta Spiraea alba is a deciduous Shrub growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Edible Uses: TeaAn infusion of the leaves tastes like China tea[207].

dwatta TonicAn infusion of the leaves is esteemed as a restorative tonic[207].

nrakta North-eastern N. America - Ontario to New York, North Carolina, Saskatchewan, Indiana and Missouri. ksacta Moist meadows, marshes, moist open low woodlands, often in sandy soils[228].

propta Seed - we have no information for this species but suggest sowing the seed as soon as it is ripe in a cold frame if possible. It is likely to require stratification before it germinates, so stored seed should be sown in a cold frame as early in the year as you receive it. Prick out the seedlings

seedlings out into individual pots and plant them out in the summer. Division in spring.

nwatta Succeeds in an ordinary well-drained but moisture retentive garden soil in sun or part shade[200]. There is some difference of opinion over the correct name for this species with some authorities using *Eupatorium rugosum*[K].

6.2.491 *Phoradendron leucarpum*

False Mistletoe, Oak mistletoe

5 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikrlwis hpa7tmwatli nyanhjen hjonli

drutta Phoradendron leucarpum is an evergreen Shrub growing to 1 m (3ft 3in) by 1 m (3ft 3in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from February to April, and the seeds ripen from November to December. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista There are recorded cases of the berries poisoning people[213]. Contact with the plant can cause dermatitis in some people[222].

dwatta Abortifacient Contraceptive OxytoxicA tea made from the leaves is said to procure abortions and also to prevent conception[213]. It causes an increase in uterine contractions and helps to stop bleeding after parturition[213]. When injected into the blood it increases blood pressure[213].

nrakta N. America - New Jersey to Florida, west to Illinois and Texas. ksacta A parasite growing on deciduous trees, especially *Acer rubrum* and *Nyssa spp*[235].

propta This is a parasitic plant that grows entirely on the host tree. To grow it you need to obtain berries and squash them onto the branches of host trees in late autumn and early winter[11]. This is best done on the lower side of the branch[1]. It is then simply a matter of waiting and hoping.

nwatta A parasitic plant, growing on the branches of several deciduous species of trees. It has a wide range of hosts, though it is usually only found on one species in any given area[200]. The host tree must be at least 20 years old[200]. This species is seldom cultivated since it can severely weaken its host[200].

6.2.492 *Verbascum lychnitis*

White Mullein

5 tlin 9 cyuc 0 kcak 2 tcan 0 dwat 1 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatprikrlwis hpa7tmwatli fyfjre7t hjonli

drutta Verbascum lychnitis is a BIENNIAL growing to 1 m (3ft 3in) by 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil.

tcanta RepellentFlower heads are used as a mouse and rat repellent in fruit stores etc[46, 61]. Dynamic accumulator.

nrakta Europe, including Britain, from Belgium south and east to Spain, Greece, Siberia and Caucasus. ksacta Waste places and calcareous banks on dry soils[17, 200].

propta Seed - sow late spring to early summer in a cold frame and only just cover the seed[200]. Germination usually takes place within 2 - 3 weeks. When they are large enough to handle, prick out the seedlings into individual pots and plant them out in late summer. The seed has a long viability[200].

nwatta An easily grown plant, it succeeds in most well-drained soils, including dry ones, preferring a sunny position[200]. Dislikes shade and wet soils[200]. Thrives on chalk[200]. Prefers a light soil[200]. Hybridizes with other members of this genus, though the progeny are usually sterile[200].

6.2.493 *Verbascum blattaria*

Moth Mullein

5 tlin 9 cyuc 0 kcak 2 tcan 0 dwat 1 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatprikrlwis hpa7tmwatli fyfjre7t hjonli

drutta Verbascum blattaria is a BIENNIAL/PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to October, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

tcanta RepellentThe plant repels insects, it is used indoors to repel moths and cockroaches[124]. Dynamic accumulator.

nrakta Europe, including Britain, from the Netherlands south and east to N. Africa, west and central Asia. ksacta Waste places in damp ground. Rather rare and not persisting, it is possibly an introduced species[17].

propta Seed - sow late spring to early summer in a cold frame and only just cover the seed[200]. Germination usually takes place within 2 - 3 weeks. When they are large enough to handle, prick out the seedlings into individual pots and plant them out in late summer. The seed has a long viability[200].

nwatta An easily grown plant, it succeeds in most well-drained soils, including dry ones, and prefers a sunny position[187, 200]. Dislikes shade[200]. Plants are hardy to about -20°C[187]. Hybridizes with other members of this genus, though the progeny are usually sterile[200].

6.2.494 *Hypericum androsaemum*

Tutsan, Sweet-amber, St. Johnswort

5 tlin 10 cyuc 0 kcak 0 tcan 1 dwat 1 m hkuc hmimhtut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli frusflatprikrlwis hpa7tmwatli fyfjre7t hjonli

drutta Hypericum androsaemum is a deciduous Shrub growing to 1 m (3ft 3in) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure.

tcanta A good ground cover plant[208]. Although it is clump forming rather than spreading it increases freely by self-sowing[186, 200]. Plants are best spaced about 90cm apart each way[208].

dwatta Antiseptic Diuretic Stomachic VulneraryThe leaves are diuretic, stomachic and vulnerary[61, 186]. They have antiseptic properties and have been used to cover open wounds[245].

nrakta Western and southern Europe, including Britain, south and east to Algeria, W. Asia and the Caucasus. ksacta Damp woods and hedges[17].

propta Seed - sow spring in a greenhouse and only just cover the seed. The seed usually germinates in 1 - 3 months at 10°C. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood 10 - 12 cm with a heel, July/August in a frame. Plant out in the following

hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flat-prikliwis hpa7tmwatli xre7t hjonli

drutta *Euonymus americanus* is a deciduous Shrub growing to 2.5 m (8ft 2in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista The fruits, seed and bark are considered to be poisonous[222].

dwatta Cathartic Diuretic Emmenagogue Expectorant Laxative Malaria TonicThe seed is strongly laxative[222]. A tea made from the roots is used in cases of uterine prolapse, vomiting of blood, painful urination and stomach aches[222, 257]. The bark is diuretic, expectorant, laxative and tonic[222]. It was used as a tea in the treatment of malaria, liver congestion, constipation etc[222, 257]. The powdered bark, applied to the scalp, was believed to eliminate dandruff[222]. An infusion of the plant has been used to stimulate menstruation and so should not be used by pregnant women[257].

nrakta Eastern N. America - New York to Florida, west to Texas and Illinois. ksacta Rich woods and ravines[43].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed requires 8 - 12 weeks warm followed by 8 - 16 weeks cold stratification and can then be sown in a cold frame[78, 98]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5 - 8cm long taken at a node or with a heel, July/August in a frame. Very easy[200].

nwatta Thrives in almost any soil, including chalk, it is particularly suited to dry shaded areas[200]. Prefers a well-drained loamy soil[1]. Requires shade from the midday sun[1, 11].

6.2.488 *Ageratina herbacea*

Fragrant Snakeroot

5 tlin 9 cyuc 0 kcaak 0 tcan 1 dwat 2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta *Ageratina herbacea* is a PERENNIAL growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

dwatta A cold infusion of the plant is drunk and also used as a lotion in the treatment of headaches and fevers[257].

nrakta South-western to South Central N. America. ksacta Pinyon-Juniper Woodland at elevations of 1500 - 2200 metres in California[276].

propta Seed - sow spring in a cold frame, only just covering the seed. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring.

nwatta Succeeds in an ordinary well-drained but moisture retentive garden soil in sun or part shade[200].

6.2.489 *Forsythia viridissima*

Golden Bells, Greenstem forsythia, Forsythia

5 tlin 8 cyuc 0 kcaak 3 tcan 2 dwat 2.5 m hkuc pcmhmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flat-prikliwsslip hpa7tmwatli dyatxre7t hjonli

drutta *Forsythia viridissima* is a deciduous Shrub growing to 2.5 m (8ft 2in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in April, and the seeds ripen from August to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is not self-fertile. Suitable for:

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

pcista Leaves contain the glycoside Phillyrin[179], its potency is unknown.

tcanta Landscape Uses: Border, Erosion control, Ground cover, Massing.

dwatta Antibacterial Antifungal Antispasmodic EmmenagogueThe fruit is antibacterial, antifungal, antispasmodic and emmenagogue[279]. It is used in Korea to treat carbuncles, mastitis, inflammation, suppuration, lymphadenitis and suppressed menstruation[279].

nrakta E. Asia - China. ksacta Ravines, margin of woods near river valleys and streamsides[266].

propta Seed - sow spring in a cold frame. The seed usually germinates within 2 months[K]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood 10 - 15cm taken at a node, July/August in a frame. Plant out in autumn or spring. A very high percentage, they root within 3 weeks[78]. Cuttings of mature wood in a sheltered outdoor bed. Good percentage[78]. Layering in spring or summer. Plants often self-layer[K].

nwatta An easily grown plant, it succeeds in all soil types[202] but prefers a rich soil. Succeeds in limey soils. Grows well in heavy clay soils. It prefers a sunny position but succeeds in semi shade though it is apt to get leggy if grown in the shade of trees[182]. Succeeds against a north-facing wall[219]. Plants are hardy to about -25°C[184]. Plants are medium to fast growing[202]. Flowers are produced on wood that is more than one year old[202]. Any pruning is best done immediately after the plant has finished flowering[182, 200]. There are some named varieties, selected for their ornamental value[11, 200]. This species is notably susceptible to honey fungus[200]. Special Features: Attractive foliage, Not North American native, Blooms are very showy. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fleshy. Thick or swollen - fibrous or tap root [2-1].

6.2.490 *Ageratina altissima*

White Snakeroot, Richweed

5 tlin 9 cyuc 0 kcaak 0 tcan 2 dwat 2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta *Ageratina altissima* is a PERENNIAL growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The plant contains tremetol, a complex alcohol, and glycosides. These toxins cause a fatal disease known as 'staggers' in cattle. The toxin can be passed through the milk and has caused fatalities in humans who have drunk affected cow's milk[274].

dwatta Diaphoretic Diuretic Febrifuge Odontalgic Stimulant Tonic UrinaryThe root is diaphoretic, diuretic, febrifuge, stimulant and tonic[257]. It has been used in the treatment of diarrhoea, gravel and urinary diseases[257]. It has also been used in herbal sweat baths to encourage sweating[257]. A decoction or infusion of the root has been taken to treat a fallen or inflamed womb[257]. The root has been chewed and held in the mouth as a treatment for toothache[257].

nrakta Eastern N. America. ksacta Low woods in river valleys in Texas[274].

propta Seed - sow spring in a cold frame, only just covering the seed. When large enough to handle, prick the

into individual pots when they are large enough to handle, and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a light sandy soil a frame. Cuttings of mature wood of the current seasons growth, 15cm long, October/November in an outdoor frame[200]. Another report says that September is a good time to do this[11]. Division of suckers in early spring[200]. They can be planted out straight into their permanent positions.

nwatta Tolerates most soils[200], but prefers a good loamy soil, abundant moisture and full sunlight[11, 200]. This species is closely related to *S. salicifolia* and is often treated as no more than a variety of it[11]. Hybridizes freely with other members of this genus[11].

6.2.418 *Daphniphyllum macropodium*

5 tlin 9 cyuc 1 kcaak 0 tcan 0 dwat m hkuc pcmhmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli nyanhjen hjonli

drutta *Daphniphyllum macropodium* is an evergreen Shrub growing to 6 m (19ft) by 6 m (19ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower in May, and the seeds ripen from August to October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves - cooked. A 'New Year's green'[177]. (This quite possibly relates to the Chinese new year which begins in February)

tcanta WoodWood - soft, close and even grained, very handsome. Used for turnery, carving etc[146]. The wood of the roots is especially handsome, it is deep red in colour[158].

nrakta E. Asia - China, Japan, Korea. ksacta By the sides of streams in moist woods[109, 184] at elevations of 600 - 1,900 metres[266].

propta Seed - sow spring in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of moderately ripened wood, 7 - 10cm with a heel or at a junction with old wood, July in individual pots in a frame. The cuttings are slow to root, give them brisk bottom heat[78]. Fair percentage[78]. Layering of current seasons growth, 12cm long in August/September. Takes 12 - 18 months. High percentage[78].

nwatta Succeeds in any good soil, tolerating lime but perhaps not suitable for very chalky soils[11]. A useful plant for moist shady positions[11]. Dislikes cold drying winds. A very ornamental plant[1], it is hardy to about -20°C[184]. Plants have withstood 30° of frost at Kew Gardens, but prefer shelter[11]. Very closely related to *D. himalense* and possibly no more than a sub-species of that species[11]. The flowers have a pungent aroma[182]. They are produced in racemes on the previous year's wood[11]. Dioecious, male and female plants must be grown if seed is required.

6.2.419 *Gentiana macrophylla*

Qin Jiao

5 tlin 9 cyuc 1 kcaak 0 tcan 3 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta *Gentiana macrophylla* is a PERENNIAL growing to 0.6 m (2ft) by 0.6 m (2ft) in. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bumblebees, butterflies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow

in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves - cooked[177]. An emergency food, used when all else fails.

dwatta Analgesic Antiinflammatory Antipyretic Antirheumatic HypotensiveQin Jiao has been used in Chinese herbalism for over 2,000 years and, like other members of this genus, the roots contain some of the most bitter compounds known and make an excellent tonic for the whole digestive system, working especially on the stomach, liver and gall bladder[238, 254]. The root is analgesic, anti-inflammatory, antipyretic, antirheumatic, diuretic, febrifuge, hypoglycaemic and hypotensive[176, 218, 238]. The root is used internally in the treatment of digestive problems, arthritis, allergic inflammations, low-grade fever in chronic diseases, jaundice and hepatitis[176, 218, 238, 254]. The root is harvested in the autumn and dried for later use.

nrakta E. Asia - China, Siberia. ksacta Steppes and glades in light woods[74]. Stream and river banks, roadsides, grassland slopes, wet meadows, forest margins, forests at elevations of 400 - 2400 metres[266].

propta Seed - best sown as soon as it is ripe in a light position in a cold frame[200]. It can also be sown in late winter or early spring but the seed germinates best if given a period of cold stratification and quickly loses viability when stored, with older seed germinating slowly and erratically[200, 239]. It is advantageous to keep the seed at about 10°C for a few days after sowing, to enable the seed to imbibe moisture[239]. Following this with a period of at least 5 - 6 weeks with temperatures falling to between 0 and -5°C will usually produce reasonable germination[239]. It is best to use clay pots, since plastic ones do not drain so freely and the moister conditions encourage the growth of moss, which will prevent germination of the seed[239]. The seed should be surface-sown, or only covered with a very light dressing of compost. The seed requires dark for germination, so the pots should be covered with something like newspaper or be kept in the dark[239]. Pot up the seedlings into individual pots as soon as they are large enough to handle and grow on in light shade in the greenhouse for at least their first winter. The seedlings grow on very slowly, taking 2 - 7 years to reach flowering size[239]. When the plants are of sufficient size, place them out into their permanent positions in late spring or early summer. Division in March[111]. Most members of this genus have either a single tap-root, or a compact root system united in a single root head, and are thus unsuitable for division[239]. Cuttings of basal shoots in late spring[238].

nwatta In general, gentians require a moist well-drained soil in a sheltered position, a certain minimum of atmospheric humidity, high light intensity but a site where temperatures are not too high[239]. They are therefore more difficult to grow in areas with hot summers and in such a region they appreciate some protection from the strongest sunlight[200, 239]. Most species will grow well in the rock garden[200]. This species requires a moist well-drained neutral to acid soil in a sheltered position[200, 238]. It prefers full sun but succeeds in partial shade[111]. Plants are hardy to at least -15°C[238]. A moisture loving plant, preferring to grow with full exposure to the sun but with plenty of underground moisture in the summer, it grows better in the north and west of Britain[1]. Plants are intolerant of root disturbance[200].

6.2.420 *Peucedanum palustre*

Marsh Hog's Fennel, Hogfennel

5 tlin 9 cyuc 1 kcaak 0 tcan 1 dwat 1.5 m hkuc hmimhtut cyutli tcupha7n hwicli hrasjlutnyik hpa7tli flat-prikliwsslip hpa7tmwatli fyifxre7t hjonli

drutta *Peucedanum palustre* is a BIENNIAL growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies), beetles. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

pcista Although no mention of toxicity has been seen for this species, skin contact with the sap of a number of members in this genus is said to cause photo-sensitivity and/or

dermatitis in some people[65, 218]. They are also said to contain the alleged 'psychotroph' myristicine[218].

kcakta Edible Parts: Edible Uses: CondimentThe root can be used as a ginger substitute[2, 4, 17, 115, 183].

dwatta Antispasmodic Epilepsy StimulantThe root is stimulant[4]. It is used in the treatment of epilepsys[4].

nrakta Europe, including Britain, from Scandanavia south and east to Spain, the Altai and Urals. ksacta Fens and marshes, usually on calcareous soils[17].

propta Seed - we have no information on this species but suggest sowing the seed in a cold frame as soon as it is ripe if this is possible otherwise in early spring. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer.

nwatta An easily grown plant, it succeeds in any moisture-retentive soil in a sunny position[200]. Suitable for group plantings in the wild garden[200].

6.2.421 Melittis melissophyllum

Bastard Balm

5 tlin 9 cyuc 1 kcaak 0 tcan 1 dwat m hkuc hmim cyutli tcup hwicli hrasjltutnyik hpa7tli flatprikliw hpa7tmwatli xre7t hjonli

drutta Melittis melissophyllum is a PERENNIAL growing to 0.3 m (1ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, moths. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: Edible Uses: TeaA coumarin scented (like new-mown hay) herb, it is occasionally used for making a 'Maiwein' or 'Maibowle' type of beverage[183].

dwatta Astringent Blood purifier Diuretic Emmenagogue Sedative VulneraryAstringent, blood purifier, diuretic, emmenagogue, sedative, vulnerary[61].

nrakta Central and southern Europe, including Britain. ksacta Hedges, scrub and mountain woods[187].

propta Seed - best sown in a cold frame in the autumn[188]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring[200] or autumn[188]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Succeeds in any good soil in partial shade[1, 187]. Prefers a rich loam[1]. Grows well in thickets, woodland edges and the garden border[1]. Plants are hardy to about -20°c[187]. The flowers have a pleasing sweet honey-like scent[245]. The leaves become sweetly fragrant as they dry[245], they retain their fragrance for a long time[200]. Members of this genus are rarely if ever troubled by browsing deer[233].

6.2.422 Aconitum violaceum

5 tlin 9 cyuc 1 kcaak 0 tcan 1 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjltutnyikfrip hpa7tli flatprikliw hpa7tmwatli hjonli

drutta Aconitum violaceum is a PERENNIAL. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from August to October. The flowers are pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The whole plant is highly toxic - simple skin contact has caused numbness in some people[1, 200]. Another report suggests that the root of this species might not be toxic[240].

kcakta Edible Parts: RootEdible Uses: Root - cooked[177]. It is eaten as a pleasant tonic[240]. These reports should be treated with great distrust due to the poisonous nature of the genus[K].

dwatta Antidote Antiinflammatory FebrifugeThe entire plant is used in Tibetan medicine, it is said to have a bitter taste and a cooling potency[241]. Antidote, anti-inflammatory and febrifuge, it is used in the treatment of snake and scorpion bites, contagious infections and inflammation of the intestines[241].

nrakta E. Asia - Himalayas. ksacta Shrubberies and open slopes, 3600 - 4800 metres from Pakistan to C. Nepal[51].

propta Seed - best sown as soon as it is ripe in a cold frame[111]. The seed can be stratified and sown in spring but will then be slow to germinate[133]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer. Division - best done in spring but it can also be done in autumn[1, 111]. Another report says that division is best carried out in the autumn or late winter because the plants come into growth very early in the year[233].

nwatta We have very little information on this species and do not know if it will be hardy in Britain, though judging by the native range of the plant it should succeed outdoors in many parts of the country. It is a polymorphic species[51]. The following notes are based on the general needs of the genus. Thrives in moist soils and in the light shade of trees[1]. Grows well in heavy clay soils. Prefers a moist soil in sun or semi-shade[200]. Prefers a calcareous soil. Grows well in open woodlands[1, 4]. Members of this genus seem to be immune to the predations of rabbits and deer[233]. A greedy plant, inhibiting the growth of nearby species, especially legumes[54].

6.2.423 Perovskia atriplicifolia

Russian Sage, Azure Sage

5 tlin 10 cyuc 1 kcaak 0 tcan 1 dwat 1.5 m hkuc htut cyutli hgatkuyctcup hwicli hyishrasjltutnyik hpa7tli flatprikliwsslip hpa7tmwatli xre7t hjonli

drutta Perovskia atriplicifolia is a PERENNIAL growing to 1.5 m (5ft) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from September to October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

kcakta Edible Parts: FlowersEdible Uses: The small lavender flowers have a sweet flavour and can be eaten in salads or used as a garnish[177, 183].

tcanta Hedge HedgeThis species is suitable for forming an internal decorative hedge of moderate height[200].

dwatta FebrifugeThe plant is used as a cooling medicine in the treatment of fevers[240].

nrakta E. Asia - Himalayas to China. ksacta Open rocky places[187]. Freely draining gravels and screes[200].

propta Seed - we have no information for this species but suggest sowing the seed in spring in a greenhouse. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of softwood in late spring in a frame[200]. Easy[200]. Cuttings of half-ripe wood, 7cm long with a heel, July/August in a cold frame[200].

nwatta Landscape Uses:Border, Container, Foundation, Massing, Seashore, Specimen. Prefers a rich well-drained dry soil and a sunny position[1, 11, 187, 190, 200]. Tolerates light shade but plants become more lax in habit in such a situation[200]. Succeeds in poor soils and, once established, tolerates drought[190]. Tolerant of dry chalk soils, it also succeeds in maritime gardens[200]. Plants are hardy to about -15°c, though the stems are often cut back by hard frosts[200]. A very ornamental plant[1]. In cultivation people often cut the plants to the ground in the spring in order to encourage strong new growth and plenty of flowers[190, 200, 233]. Plants rarely produce seed in Britain[200]. The crushed leaves are very aromatic[190].

nwatta Succeeds in most soils so long as they are not water-logged[200]. This species is related to *I. crenata*[11]. Resents root disturbance, especially as the plants get older[11]. It is best to place the plants into their permanent positions as soon as possible, perhaps giving some winter protection for their first year or two[K]. Plants are very tolerant of pruning and can be cut right back into old wood if required[188]. Dioecious. Male and female plants must be grown if seed is required.

6.2.484 Euonymus fortunei

Winter Creeper, Wintercreeper Euonymus

5 tlin 9 cyuc 0 kcaak 0 tcan 1 dwat 4.5 m hkuc pcmhmmhtut cyutli kyuctcup hwicli hrasjltutnyikfrip hpa7tli flatprikliw hpa7tmwatli xre7t hjonli

drutta Euonymus fortunei is an evergreen Climber growing to 4.5 m (14ft) by 10 m (32ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, in flower in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Although no records of toxicity have been seen for this species, a number of plants in this genus are suspected of being poisonous and so some caution is advised.

tcanta Hedge HedgeA good evergreen ground cover plant[184, 200]. The sub species *E. fortunei radicans* and *E. fortunei* carrier are particularly useful, other forms to use include 'Emerald and Gold', 'Emerald Gaieity', 'Coloratus', 'Dart's Carpet' and 'Kewensis[182, 188, 197]. Plants can be grown as a low hedge[29], the varieties 'Emerald and Gold' and 'Variiegatus' are normally used. They are very tolerant of clipping[200].

dwatta Cancer Women's complaintsPlants contain the anticancer compound dulcitol[218]. The plant is used in gynaecological applications[218].

nrakta E. Asia - China, Japan, Korea. ksacta Woods and thickets in low mountains all over Japan[58].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed requires 8 - 12 weeks warm followed by 8 - 16 weeks cold stratification and can then be sown in a cold frame[78, 98]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5 - 8cm long taken at a node or with a heel, July/August in a frame. Very easy[200].

nwatta Landscape Uses:Container, Erosion control, Ground cover, Massing. Thrives in almost any soil, including chalk, and is particularly suited to dry shaded areas[200]. Grows well in heavy clay soils. Prefers a well-drained loamy soil. Thrives in sunny positions and in deep shade[11, 182], though it does not fruit so well in the shade. Plants are hardy to about -18°c[202]. A shrubby somewhat creeping plant that can also climb by means of aerial roots[184], if placed by a support, a wall, tree or fence, the plant will start to climb it and will be self-attaching to a large degree[182, 219]. Plants do not normally require pruning[219]. Plants have two forms of growth, a juvenile form and a mature form when the plants come into flower[219]. Plants in Britain often retain the juvenile form and never flower[219]. A polymorphic species[58], there are a number of named varieties selected for their ornamental value[182, 202]. Special Features:Not North American native, Invasive, Inconspicuous flowers or blooms.

6.2.485 Forsythia x intermedia

Golden Bell, Border Forsythia

5 tlin 8 cyuc 0 kcaak 3 tcan 0 dwat 2.5 m hkuc pcmhmmhtut cyutli tcup hwicli hrasjltutnyik hpa7tli flatprikliwsslip hpa7tmwatli xre7t hjonli

drutta Forsythia x intermedia is a deciduous Shrub growing to 2.5 m (8ft) by 2.5 m (8ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from March to April. The species is hermaphrodite

(has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

tcanta Hedge HedgeCan be grown as a tall hedge, the var. 'Lynwood' is frequently used[29]. Var. 'Spectabilis' also makes a good hedge[200] as does 'Beatrix Farrand'[188]. Landscape Uses: Border, Erosion control, Espalier, Pest tolerant, Hedge, Massing, Screen, Specimen.

nrakta A hybrid of garden origin, *F. suspensa* x *F. viridissima*. ksacta Not known in the wild.

propta Seed - sow spring in a cold frame. The seed usually germinates within 2 months[K]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. This is a hybrid species and seed will not come true to type. Cuttings of half-ripe wood 10 - 15cm taken at a node, July/August in a frame. Plant out in autumn or spring. A very high percentage, they root within 3 weeks[78]. Cuttings of mature wood in a sheltered outdoor bed. Good percentage[78].

nwatta An easily grown plant, it succeeds in a well drained ordinary garden soil but prefers a rich soil[1]. Succeeds in limy soils[11]. Prefers a sunny position but succeeds in semi shade[200]. Plants are tolerant of deep shade[219]. A very ornamental plant[1], there are several named varieties. Any pruning out of weak shoots, plus any trimming of hedges, is best done after the plant has flowered[188]. Birds may destroy the flower buds in cold areas[200]. This species is notably susceptible to honey fungus[200]. Special Features:Not North American native, Blooms are very showy. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fleshy. Thick or swollen - fibrous or tap root [2-1].

6.2.486 Myricaria germanica

5 tlin 9 cyuc 0 kcaak 0 tcan 1 dwat 2 m hkuc htut cyutli tcup hwicli hrasjltutnyik hpa7tli flatprikliwsslip hpa7tmwatli xre7t hjonli

drutta Myricaria germanica is a deciduous Shrub growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers moist soil.

tcanta FuelThe wood is used as a fuel[146].

dwatta AperientA decoction of the bark is aperient[240]. It is used in Spain in the treatment of jaundice[240].

nrakta C. and S. Europe to E. Asia. ksacta River banks, by the sides of mountain streams and other sandy occasionally inundated places[11].

propta Seed - sow early spring in a cold frame and only just cover the seed. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame[200]. Cuttings of mature wood of the current seasons growth, November to January in a sandy propagating mix in an open frame[11, 200].

nwatta Prefers a fertile well-drained soil in full sun with shelter from cold drying winds[200]. Tolerates chalk soils[200]. An easily grown plant, preferring a damp sandy soil[182]. Closely related and very similar to *Tamarisk* spp[182].

6.2.487 Euonymus americanus

Strawberry Bush, Bursting-heart

5 tlin 9 cyuc 0 kcaak 0 tcan 2 dwat 2.5 m hkuc

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

pcista Although no reports of toxicity have been seen for this species, some if not all members of this genus are mildly poisonous. The toxic principle is dissipated by heat or by drying[65].

tcanta Plants can be used as ground cover[208]. They grow rapidly to give a tangled mass of growth in sun or moderate shade[197].

dwatta Antiseptic RefrigerantThe plant is antiseptic and refrigerant. It is used as a gargle for ulcerated throats and also to treat dog bites[178].

nrakta W. Asia - Turkey and westwards. **ksacta** Hot dry valleys, especially on rocks by rivers, and in scrub to 3000 metres[184]. River banks, riparian forests, scrub gullies, slopes and sand depressions in semi-desert and desert zones[74].

propta Seed - best sown as soon as it is ripe in a cold frame[164, 200]. Sow stored seed as soon as it is obtained in a cold frame. Pre-soak the seed for 12 hours in warm water and remove as much of the tail and outer coat as possible[164]. A period of cold stratification is beneficial[164]. The seed germinates in 1 - 9 months or more at 20°C[164]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant out in late spring or early summer, after the last expected frosts. Internodal cuttings of soft to semi-ripe wood, late spring in sandy soil in a frame[200]. Layering of old stems in late winter or early spring[200]. Layering of current seasons growth in early summer[200].

nwatta Prefers a deep moist soil with its roots in the shade[11, 200]. Dislikes poorly-drained heavy clay soils, but grows well in clay if grit is added for drainage[11, 200]. Dislikes light sandy soils[11]. Does well on chalk[1]. Succeeds in acid as well as alkaline soils[200]. Plants are hardy to about -15°C[184]. A twining plant[182]. The leafstalks wrap themselves around twigs and branches for support. When a side of the stalk touches an object, the growth on that side slows down whilst the other side grows at its normal rate - this causes the leaf stalk to entwine the object it is touching[212]. When planting out, in order to avoid the disease 'clematis wilt', it is best to plant the rootball about 8cm deeper in the soil. This will also serve to build up a good root crown of growth buds[200]. Flowers are produced on the current season's growth, any pruning is best carried out in spring[219]. Plants in this genus are notably resistant to honey fungus[200]. Plants seem to be immune to the predations of rabbits[233]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54]. The flowers have a delicate perfume similar to cowslips[245].

6.2.482 Clematis tibetana

5 tin 9 cyuc 0 kcaak 0 tcan 2 dwat 4 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikklwis hpa7tmwatli xre7t hjonli

drutta Clematis tibetana is a deciduous Climber growing to 4 m (13ft 1in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no reports of toxicity have been seen for this species, some if not all members of this genus are mildly poisonous. The toxic principle is dissipated by heat or by drying[65].

dwatta Antipruritic AntitumorThe stem and flowers are used in Tibetan medicine, they are considered to have and acrid and sweet taste with a heating potency[241]. They promote stomach heat and destroy 'cold tumours'[241]. They are used in the treatment of skin irritations and itches, and tumours[241].

nrakta E. Asia - Himalayas in India, Nepal, China and Tibet. **ksacta** Slopes, scrub, grassy areas and gravelly river banks at elevations of 2200 - 4800 metres in western China[266].

propta Seed - best sown as soon as it is ripe in a cold frame[164, 200]. Sow stored seed as soon as it is obtained in a cold frame. Pre-soak the seed for 12 hours in warm water and remove as much of the tail and outer coat as possible[164]. A period of cold stratification is beneficial[164]. The seed germinates in 1 - 9 months or more at 20°C[164]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant out in late spring or early summer, after the last expected frosts. Internodal cuttings of soft to semi-ripe wood, late spring in sandy soil in a frame[200]. Layering of old stems in late winter or early spring[200]. Layering of current seasons growth in early summer[200].

nwatta Prefers a deep moist soil with its roots in the shade[11, 200]. Dislikes poorly-drained heavy clay soils, but grows well in clay if grit is added for drainage[11, 200]. Dislikes light sandy soils[11]. Does well on chalk[1]. Succeeds in acid as well as alkaline soils[200]. Plants are hardy to about -15°C[184]. A twining plant[182]. The leafstalks wrap themselves around twigs and branches for support. When a side of the stalk touches an object, the growth on that side slows down whilst the other side grows at its normal rate - this causes the leaf stalk to entwine the object it is touching[212]. When planting out, in order to avoid the disease 'clematis wilt', it is best to plant the rootball about 8cm deeper in the soil. This will also serve to build up a good root crown of growth buds[200]. Flowers are produced on the current season's growth, any pruning is best carried out in spring[219]. Plants in this genus are notably resistant to honey fungus[200]. Plants seem to be immune to the predations of rabbits[233]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

6.2.483 Ilex yunnanensis

5 tin 9 cyuc 0 kcaak 0 tcan 1 dwat 4 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikklwis hpa7tmwatli nyanhjen hjonli

drutta Ilex yunnanensis is an evergreen Shrub growing to 4 m (13ft 1in). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from May to June, and the seeds ripen from September to November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific reports of toxicity have been seen for this species, the fruits of at least some members of this genus contain saponins and are slightly toxic. They can cause vomiting, diarrhoea and stupor if eaten in quantity[274]. The fruit is poisonous[177].

dwatta FebrifugeA tea made from the leaves is used as a febrifuge[218].

nrakta E. Asia - W. China to eastern Tibet. **ksacta** Evergreen broad-leaf forests, thickets, Tsuga forests, margins of woods, shrub forests in valleys or mountains at elevations of 1100 - 3500 metres[266].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. It can take 18 months to germinate. Stored seed generally requires two winters and a summer before it will germinate and should be sown as soon as possible in a cold frame. Scarification, followed by a warm stratification and then a cold stratification may speed up the germination time[78, 80]. The seedlings are rather slow-growing. Pot them up into individual pots when they are large enough to handle and grow them on in light shade in a cold frame for their first year. It is possible to plant them out into a nursery bed in late spring of the following year, but they should not be left here for more than two years since they do not like being transplanted. Alternatively, grow them on in their pots for a second season and then plant them out into their permanent positions in late spring or early summer. Give them a good mulch and some protection for their first winter outdoors. Cuttings of almost ripe wood with a heel, August in a shaded position in a cold frame. Leave for 12 months before potting up. Layering in October. Takes 2 years[78].

There are some named varieties, selected for their ornamental value[200]. Special Features:Attractive foliage, Fragrant foliage, Not North American native, Attracts butterflies, Suitable for cut flowers.

6.2.424 Cuscuta japonica

Japanese Dodder

5 tin 9 cyuc 1 kcaak 0 tcan 2 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikklwis hpa7tmwatli xre7t hjonli

drutta Cuscuta japonica is an ANNUAL CLIMBER growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from August to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young growth, boiled and seasoned[177].

dwatta Aphrodisiac Demulcent Diaphoretic Enuresis Hepatic Ophthalmic TonicA sweet, pungent herb that acts mainly as a liver and kidney stimulant[238], the seed of Japanese dodder is aphrodisiac, demulcent, diaphoretic, enuresis, hepatic and tonic[147, 176, 178, 218, 238]. A decoction of the seed is used to treat a variety of complaints including diarrhoea, vaginal discharge, enuresis, backache, constipation and impotence[218]. The young shoots are used to treat sore eyes[218].

nrakta E. Asia - China, Japan, Korea. **ksacta** Parasitic on shrub branches[147] in lowland and low mountains all over Japan[58].

propta Seed - best sown as soon as it is ripe in the autumn, by lodging it among the stems of a host plant[238].

nwatta This is a parasitic species that is devoid of leaves, roots or chlorophyll and so is totally dependant upon its host[238]. It must be grown next to the host plant, which it penetrates with suckers in order to obtain nutriment[238]. Plants are hardy to at least -15°C[238]. A climbing plant, supporting itself by twining around other plants[238].

6.2.425 Berberis chinensis

5 tin 9 cyuc 1 kcaak 0 tcan 2 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikklwis hpa7tmwatli fyixre7t hjonli

drutta Berberis chinensis is a deciduous Shrub. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[177].

tcanta A yellow dye is obtained from the root. **dwatta** Antibacterial Cancer DysenteryBerberine, universally present in rhizomes of Berberis species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Licorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta E. Asia - China. **ksacta** Sandy mountain slopes and river sands[74].

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them

in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78].

nwatta Prefers a warm moist loamy soil and light shade but is by no means fastidious, succeeding in thin, dry and shallow soils. Grows well in heavy clay soils. Plants are hardy to about -25°C[184]. Plants can be pruned back quite severely, they respout well from the base[200]. This species is closely related to *B. poretii*. C.K.Schn., differing in its broader leaves and dark red fruits[200]. The range of this plant is often mistakenly given as the Caucasus, this is based on a misidentification[200]. Hybridizes freely with other members of this genus[1].

6.2.426 Polygala vulgaris

Milkwort, Common milkwort

5 tin 9 cyuc 1 kcaak 0 tcan 2 dwat 0.4 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikklwis hpa7tmwatli xre7t hjonli

drutta Polygala vulgaris is a PERENNIAL growing to 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been seen for this species, at least one member of this genus is said to be poisonous in large quantities.

kcakta Edible Parts: Edible Uses: TeaThe leaves are used as a tea substitute[177]. They are used to adulterate green China tea[2].

dwatta Diaphoretic Diuretic Expectorant StimulantThe bitter-tasting milkwort has a reputation for increasing milk flow in nursing mothers, but this belief is in fact unfounded[254]. Whilst little used in modern herbalism, the root and aerial parts of the plant contain triterpenoid saponins which promote the clearing of phlegm from the bronchial tubes and so is a valuable herb for the treatment of respiratory problems such as chronic bronchitis, bronchial asthma and convulsive coughs such as whooping cough[254]. The plant is also thought to have sweat-inducing and diuretic properties[254].

nrakta Europe, including Britain, from Norway south and east to N. Africa and W. Asia. **ksacta** Grassland on heaths, dunes etc[17], on acidic and alkaline soils[214].

propta Seed - sow spring or autumn in a cold frame[214]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division. Cuttings of young shoots in a frame in late spring[1].

nwatta Prefers a moderately fertile moisture-retentive well-drained soil, succeeding in full sun if the soil remains moist throughout the growing season, otherwise it is best in semi-shade[200]. Dislikes shade according to another report. A very polymorphic species[200].

6.2.427 Anemone nikoensis

5 tin 9 cyuc 1 kcaak 0 tcan 0 dwat 0.3 m hkuc pcmimhmhtut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatprikklwissip hpa7tmwatli xre7t hjonli

drutta Anemone nikoensis is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

pcista Although no specific mention has been seen for this species, many members of this genus contain protoanemonin, an irritating acrid oil that is an enzymatic breakdown product of the glycoside ranunculin. While protoanemonin can cause severe topical and gastrointestinal irritation, it is unstable and changes into harmless anemonin when plants are dried or heated[4, 10, 19, 65, 270].

ksakta Edible Parts: LeavesEdible Uses: Leaves - cooked[177]. Some caution is advised, see the notes above on toxicity.

nrakta E. Asia - Japan. ksakta Woods in foothills, C. and S. Japan[58].

propta Seed - best sown in a cold frame as soon as it is ripe in the summer[1]. Surface sow or only just cover the seed and keep the soil moist. Sow stored seed as soon as possible in late winter or early spring. The seed usually germinates in 1 - 6 months at 15°c[133]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for at least their first year. When the plants are large enough, plant them out in the spring. Division in late summer after the plant dies down.

nwatta Succeeds in ordinary garden soil but prefers a moist well-drained humus-rich soil[1, 200]. Tolerates dry summer conditions[200]. This species is closely related to *A. nemerosa*[200]. Plants seem to be immune to the predations of rabbits[233]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

6.2.428 *Sedum arboroseum*

Garden Stonecrop

5 tlin 9 cyuc 1 kcaak 0 tcan 2 dwat 0.5 m hkuc hmimhtut cyuti hgtakuyctup hwicli hrasjlutnyik hpa7tli flat-prikliwis hpa7tmwatli xre7t hjonli

drutta *Sedum arboroseum* is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from September to October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

ksakta Edible Parts: LeavesEdible Uses: Young plant - cooked. A famine food, it is only used when all else fails[177].

dwatta Poulitice Women's complaintsThe leaves are used in the treatment of fevers, inflammations and wounds[218]. The leaf juice is applied to burns and eruptions[218]. The flowers are used in the treatment of vaginal fluxes, nervous affections of children, corneal opacity and prolapse of the genitals following labour[218]. The whole plant is crushed and used as a poultice on inflammations etc[218].

nrakta E. Asia - China, Japan. ksakta Not known in a truly wild situation[58].

propta Seed - surface sow in spring in well-drained soil in a sunny position in a greenhouse. Do not allow the soil to dry out. Prick out the seedlings into individual pots when they are large enough to handle. If sufficient growth is made, it is possible to plant them out during the summer, otherwise keep them in a cold-frame or greenhouse for their first winter and plant them out in early summer of the following year[K]. Division is very easy and can be carried out at almost any time in the growing season, though is probably best done in spring or early summer. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Succeeds in most soils[188] but prefers a fertile well-drained soil, succeeding in dry soils but preferring one that does not dry out completely[200]. Established plants are very drought tolerant[200]. Plants can be grown on walls[200]. Requires a sunny position[188]. Hardy to at least -15°c[200]. All members of this genus are said to have edible leaves, though those species that have yellow flowers can cause stomach upsets if they are eaten in quantity[62, 85]. Plants in this genus seem to be immune to the predations of rabbits[233].

6.2.429 *Euphrasia officinalis*

Eyebright

5 tlin 9 cyuc 1 kcaak 0 tcan 3 dwat 0.2 m hkuc hmimhtut cyuti tcup hwicli hrasjlutnyik hpa7tli flat-prikli-wisslip hpa7tmwatli fyfjxre7t hjonli

drutta *Euphrasia officinalis* is a ANNUAL growing to 0.2 m (0ft 8in) by 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Use for eye conditions currently not recommended. Adverse effects include: mental confusion, headaches, eye pressure, redness and swelling of the eye if 10-60 lotion drops used. Eye symptoms possibly followed by sensitivity to light, sneezing, nausea, constipation, cough, shortness of breath and increased passing of urine [301].

ksakta Edible Parts: LeavesEdible Uses: Leaves - raw[7]. They are occasionally used in salads for their slightly bitter flavour[7].

dwatta Antiinflammatory Astringent Digestive Homeopathy Ophthalmic TonicEyebright has a long history of herbal use in the treatment of eye problems and is still in current herbal use[4]. It is important that only the correct forms of eyebright, with glandular hairs on the calyx, are used, since other forms do not possess medicinal virtues[268]. Eyebright tightens the mucous membranes of the eye and appears to relieve the inflammation of conjunctivitis and blepharitis[254]. Its ability to counter catarrh means that it is often used for infectious and allergic conditions affecting the eyes, middle ear, sinuses and nasal passages[254]. The whole plant is anti-inflammatory, astringent, digestive, ophthalmic and slightly tonic[4, 7, 9, 14, 165, 220]. It is taken internally in the treatment of catarrh, sinusitis, hay fever, upper respiratory tract infections etc[238]. As an ophthalmic, an infusion of the plant can be taken internally or used as an eye wash. Alternatively, the diluted juice can be dropped into the eyes[232]. Some caution should be exercised, experimentally it can induce side effects including dim vision[222]. The plant's astringency makes it inappropriate for treating dry or stuffy congestion[254]. The plant can be used externally as a poultice to aid the healing of wounds[268]. Eyebright should be harvested when in flower and can be dried for later use[238]. The dried herb is a ingredient of herbal smoking mixtures, used in the treatment of chronic bronchial colds[4]. A homeopathic remedy is made from the expressed juice of the plant[232]. It is used particularly in the treatment of eye inflammations and colds[7, 232].

nrakta W. Europe, including Britain, to E. Asia. ksakta Moist grassland and chalky pastures, semi-parasitic on grass[4, 7].

propta Sow the seed outdoors in situ in early spring amongst grass in a moist but not marshy soil[1].

nwatta Succeeds in most soils, preferring chalk or limestone[200]. Eyebright is a semi-parasitic plant, growing on the roots of various species of grass[4] and also on *Trifolium pratense* and *Plantago* species[238]. The grass does not seem to suffer unduly from this parasitism since eyebright is an annual and its cells do not penetrate very deeply into the grass[4]. There is some doubt over the validity of the name of this species, some botanists now call it *Euphrasia rostkoviana*. Eyebright is a variable aggregate species, some botanists divide it into a number of different species[1, 50]. Only those forms of eyebright which have glandular hairs on the calyx possess medicinal qualities[268]. It hybridizes freely with other members of this genus[200].

6.2.430 *Monarda punctata*

Horse Mint, Spotted beebalm

5 tlin 9 cyuc 1 kcaak 0 tcan 3 dwat 0.8 m hkuc hmimhtut cyuti kyuctup hwicli hrasjlutnyikfrip hpa7tli flat-prikliwis hpa7tmwatli fyfjxre7t hjonli

drutta *Monarda punctata* is a ANNUAL/PERENNIAL growing to 0.8 m (2ft 7in) by 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from

pcista Although no reports of toxicity have been seen for this species, some if not all members of this genus are mildly poisonous. The toxic principle is dissipated by heat or by drying[65].

dwatta MiscellanyThe juice of the plant is inhaled to relieve sinusitis[272].

nrakta E. Asia - Himalayas from Pakistan and Kashmir to Bhutan, Tibet and western China. ksakta Forests at mid altitudes in the Himalayas, especially along the sides of streams[273].

propta Seed - best sown as soon as it is ripe in a cold frame[164, 200]. Sow stored seed as soon as it is obtained in a cold frame. Pre-soak the seed for 12 hours in warm water and remove as much of the tail and outer coat as possible[164]. A period of cold stratification is beneficial[164]. The seed germinates in 1 - 9 months or more at 20°c[164]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for the first winter. Plant out in late spring or early summer, after the last expected frosts. Internodal cuttings of soft to semi-ripe wood, late spring in sandy soil in a frame[200]. Layering of old stems in late winter or early spring[200]. Layering of current seasons growth in early summer[200].

nwatta Requires a warm, sheltered sunny position and plenty of water during the growing season[273]. Prefers a deep moist soil with its roots in the shade[11, 200]. Dislikes poorly-drained heavy clay soils, but grows well in clay if grit is added for drainage[11, 200]. Dislikes light sandy soils[11]. Succeeds in acid as well as alkaline soils[200]. When planting out, in order to avoid the disease 'clematis wilt', it is best to plant the rootball about 8cm deeper in the soil. This will also serve to build up a good root crown of growth buds[200]. A very vigorous plant, with new shoots extending up to 6 metres in a season. It can be rather invasive[273]. A twining plant[182]. The leafstalks wrap themselves around twigs and branches for support. When a side of the stalk touches an object, the growth on that side slows down whilst the other side grows at its normal rate - this causes the leaf stalk to entwine the object it is touching[212]. Plants flower on the current seasons growth. They often require no pruning, especially if left to clamber into large shrubs and trees. Weak or dead stems can be removed in the winter and, where pruning may be required to reduce the size of the plant, shoots can be cut back by up to two thirds in the winter[273]. Plants in this genus are notably resistant to honey fungus[200]. Plants seem to be immune to the predations of rabbits[233]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

6.2.479 *Cotoneaster bacillaris*

5 tlin 9 cyuc 0 kcaak 0 tcan 1 dwat 5 m hkuc hmimhtut cyuti kyuctup hwicli hyishrasjlutnyikfrip hpa7tli flat-prikliwsslip hpa7tmwatli xre7t hjonli

drutta *Cotoneaster bacillaris* is a deciduous Shrub growing to 5 m (16ft 5in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies, midges. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. It can tolerate atmospheric pollution.

tcanta Dye WoodA rose-tan dye is obtained from the fruit[168]. Wood - very hard, elastic, close and even grained but splits and warps easily. Too small for many purposes but the branches are used for making walking sticks, agricultural implements etc[11, 146, 158].

dwatta AstringentThe stolons are said to be astringent[240].

nrakta E. Asia - W. Himalayas. ksakta Blanks in forests, old grazing camps etc, in the higher hill forests, 1500 - 3000 metres[146].

propta Seed. Members of this genus hybridize freely so, if you require seed that breeds true, it is important to obtain it from a known wild source or from a controlled fertilization of garden plants. The seed is best sown as soon as it is ripe

in the autumn in a cold frame, when it will usually germinate in the spring[11, 200]. Stored seed germinates faster if given 3 months warm stratification at 15°c and then 3 months cold stratification at 4°c[164]. The seed usually germinates within 1 - 18 months at 15°c but it can take 2 years[164]. Pot the seedlings up as soon as they are large enough to handle and plant them out into nursery beds or into their permanent positions when they are more than 10cm tall. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200].

nwatta A vigorous and easily grown plant[1], it prefers a good soil but also does well in poor soils[1, 11, 200]. It thrives in lime and is also happy in peaty soils[1]. It succeeds in any soil that is not marshy or waterlogged[11, 200]. Succeeds in dry soils[188]. Grows well in heavy clay soils. Succeeds in full sun or semi-shade but does not fruit so freely in a shady position[11, 200]. Tolerates atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. The flowers, when inhaled near to, have an unpleasant smell like decaying fish[245]. They are very attractive to bees whilst the fruit is a good winter food source for many species of birds[200]. A very ornamental plant[1]. Trees are notably susceptible to honey fungus[200].

6.2.480 *Weigela japonica*

5 tlin 9 cyuc 0 kcaak 0 tcan 1 dwat 5 m hkuc hmimhtut cyuti tcup hwicli hrasjlutnyik hpa7tli flat-prikliwis hpa7tmwatli xre7t hjonli

drutta *Weigela japonica* is a deciduous Shrub growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to June, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. It can tolerate atmospheric pollution.

pcista The leaves are slightly toxic[178]. tcanta Hedge HedgePlants can be grown as a hedge[178].

dwatta SalveSalve. Used as a wash for virulent sores[178].

nrakta E. Asia - C. and S. Japan. ksakta A rare plant, grwing on sunny hills and in mountains at elevations of 100 - 1800 metres[275].

propta Seed - we have no information for this species but suggest sowing the seed in a cold frame as soon as it is ripe if this is possible, otherwise in late winter or early spring. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer. Softwood basal cuttings, 10 - 12cm long, in a sandy soil in a cold frame in early summer[200]. Cuttings of half-ripe wood, 8 - 10 cm with a heel, July/August in a frame[200]. Cuttings of mature wood of the current seasons growth. 20 cm long, November in a sheltered outdoor nursery bed[200].

nwatta An easily grown plant, succeeding in most fertile soils[11, 200]. Prefers a moist well-drained soil in sun or partial shade[200]. Tolerates atmospheric pollution[200]. Plants are very floriferous and can exhaust themselves, literally flowering themselves to death. The flowers are borne in the leaf nodes of the previous years growth and any pruning is therefore best done as soon as the plant has finished flowering[182]. There are some named forms selected for their ornamental value[200]. Plants in this genus are notably resistant to honey fungus[200].

6.2.481 *Clematis orientalis*

Oriental virginsbower

5 tlin 9 cyuc 0 kcaak 1 tcan 1 dwat 4 m hkuc hmimhtut cyuti tcup hwicli hrasjlutnyik hpa7tli flat-prikliwis hpa7tmwatli xre7t hjonli

drutta *Clematis orientalis* is a deciduous Climber growing to 4 m (13ft 1in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers

6.2.475 Acer caesium

5 tlin 9 cyuc 0 kcaak 0 tcan 1 dwat 15 m hkuc
hnmihmtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikliw hpa7tmwatli hjonli

drutta Acer caesium is a deciduous Tree growing to 15 m (49ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in April. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

tcanta Preservative WoodThe leaves are packed around apples, rootcrops etc to help preserve them[18, 20]. Wood - close grained, soft to moderately hard. Occasionally used for carving, bowls, cups etc[146, 158].

dwatta AstringentThe juice of the bark is used externally in Nepal to treat muscular swellings, boils and pimples[272].

nrakta E. Asia - Himalayas, China. ksacta Generally found in open places such as grazing grounds. Isolated trees are found in coniferous forests at 2400 - 3800 metres in Kashmir[145].

propta Seed - best sown as soon as it is ripe in a cold frame, it usually germinates in the following spring. Pre-soak stored seed for 24 hours and then stratify for 2 - 4 months at 1 - 8°C. It can be slow to germinate. The seed can be harvested 'green' (when it has fully developed but before it has dried and produced any germination inhibitors) and sown immediately. It should germinate in late winter. If the seed is harvested too soon it will produce very weak plants or no plants at all[80, 113]. When large enough to handle, prick the seedlings out into individual pots and grow them on until they are 20cm or more tall before planting them out in their permanent positions. Layering, which takes about 12 months, is successful with most species in this genus. Cuttings of young shoots in June or July. The cuttings should have 2 - 3 pairs of leaves, plus one pair of buds at the base. Remove a very thin slice of bark at the base of the cutting, rooting is improved if a rooting hormone is used. The rooted cuttings must show new growth during the summer before being potted up otherwise they are unlikely to survive the winter.

nwatta Of easy cultivation, it prefers a good moist well-drained soil in a sunny position but tolerates some shade. Grows well in heavy clay soils. Chlorosis can sometimes develop as a result of iron deficiency when the plants are grown in alkaline soils, but in general maples are not fussy as to soil pH. Most maples are bad companion plants, inhibiting the growth of nearby plants[18, 20]. This species is closely related to *A. giralduii*[11].

6.2.476 Catalpa bungei

5 tlin 9 cyuc 0 kcaak 0 tcan 2 dwat 10 m hkuc
hnmihmtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliw hpa7tmwatli xre7t hjonli

drutta Catalpa bungei is a deciduous Tree growing to 10 m (32ft 10in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from July to August, and the seeds ripen from September to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. It can tolerate atmospheric pollution.

tcanta WoodWood - hard, excellent quality. Used for printing blocks, chess tables etc[174, 178].

dwatta Anthelmintic Poultice StomachicThe stem bark is made into a lotion for cancer[218]. It is also anthelmintic and stomachic[178, 218]. The leaf, stem bark and the seeds are all used as dressings for sores, boils etc[218].

nrakta E. Asia - C. China. ksacta Roadsides in. Gansu, Hebei, Henan, Hunan, Jiangsu, Shaanxi, Shandong, Shanxi, Zhejiang[266].

propta Seed - best sown outdoors, or in a cold frame, as soon as it is ripe[200]. Stratify stored seed for 3 weeks at 1°C and sow in spring[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow

them on in a cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Softwood cuttings, 10cm long, in a frame. They should be taken in late spring to early summer before the leaves are fully developed[200]. Root cuttings in winter[200].

nwatta Prefers a good moist loamy soil and a sunny position that is not exposed[1, 11]. Tolerates heavy clay soils. Very resistant to atmospheric pollution[188]. Plants are hardy to about -15°C, probably more in continental climates[200], they grow best in areas with hot summers[188]. Protect plants from late frosts when they are young[200]. Transplants easily[200]. There are some named varieties selected for their ornamental value[188]. Plants in this genus are notably resistant to honey fungus[200].

6.2.477 Fraxinus longicuspis

5 tlin 9 cyuc 0 kcaak 0 tcan 1 dwat 8 m hkuc
htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliw hpa7tmwatli xre7t hjonli

drutta Fraxinus longicuspis is a deciduous Tree growing to 8 m (26ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

tcanta Inka bluish indelible dye is produced by steeping the bark in water[178].

dwatta Astringent Tonic UrinaryAstringent. A tonic for the genito-urinary system[178].

nrakta E. Asia - central and southern Japan. ksacta Deciduous forests in mountains at elevations of 100 - 1100 metres, C. and S. Japan[58, 275].

propta The seed is best harvested green - as soon as it is fully developed but before it has fully dried on the tree - and can then be sown immediately in a cold frame[80]. It usually germinates in the spring[80]. Stored seed requires a period of cold stratification and is best sown as soon as possible in a cold frame[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant them out into their permanent positions or a nursery bed in late spring or early summer of the following year. If you have sufficient seed then it is possible to sow it directly into an outdoor seedbed, preferably in the autumn. Grow the seedlings on in the seedbed for 2 years before transplanting either to their permanent positions or to nursery beds.

nwatta Prefers a deep loamy soil, even if it is on the heavy side[1, 200]. Most members of this genus are gross feeders and require a rich soil[11, 200]. Plants succeed when growing in exposed positions[200] and also in alkaline soils[11]. They tolerate atmospheric pollution[200]. This species is closely related to *F. chinensis*[11]. There is some confusion over the correct name for this species. The information was gathered under the name *F. pubinervis* which, according to [11] is a synonym for *F. longicuspis* Sieb. and Zucc. However, [200] says that *F. pubinervis* a synonym for *F. sieboldiana* and that *F. longicuspis* Hort. is also a synonym of *F. sieboldiana*. This species might be dioecious, in which case male and female plants must be grown if seed is required.

6.2.478 Clematis connata

5 tlin 9 cyuc 0 kcaak 0 tcan 1 dwat 7 m hkuc
hnmihmtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliw hpa7tmwatli xre7t hjonli

drutta Clematis connata is a deciduous Climber growing to 7 m (23ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Edible Uses: Condiment TeaLeaves - raw or cooked. A strong aromatic taste, they are used as a flavouring in salads and cooked foods, and also as an aromatic tea[183].

tcanta Essential IncenseThe plant has a pleasing aroma and has been hung in the house as an incense[257].

dwatta Antiseptic Carminative Diaphoretic Diuretic Emmenagogue Rubefacient Stimulant Stomachic VesicantHorse mint was traditionally taken by several native North American Indian tribes to treat nausea and vomiting, and to encourage perspiration during colds. It was also applied externally as a poultice to treat swellings and rheumatic pains[254]. Nowadays it is used primarily to treat digestive and upper respiratory tract problems[254]. The leaves are carminative, diaphoretic, diuretic, emmenagogue, rubefacient, stimulant, stomachic and vesicant[4, 61, 238]. An infusion of the leaves is used in the treatment of flatulence, nausea, indigestion, catarrh in the upper respiratory tract, and to induce sweating and promote urination[4, 254]. The herb is principally used externally as a rubefacient, applied as a poultice it helps to lessen the pain of arthritic joints by increasing the flow of blood in the area and thereby hastening the flushing out of toxins[4, 254]. The leaves can be harvested before the plant flowers, or they can be harvested with the flowering stems. They can be used fresh or dried[238]. The plant is a rich source of the medicinal essential oil 'thymol', which is anti-septic[4, 213, 222]. The plant has been commercially cultivated for its essential oil, though this is now produced synthetically[222]. Thymol is also an effective hookworm remedy, but must be ingested in such large quantities that it can prove fatal to the patient[213].

nrakta N. America - Louisiana and Florida, north to Long Island. ksacta Dry sandy soils in fields on or near to the coastal plain[43, 235].

propta Seed - sow mid to late spring in a cold frame. Germination usually takes place within 10 - 40 days at 20°C. When large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in early summer. The seed can also be sown in situ in late summer in areas where the winters are not too severe and will produce larger plants. Cuttings of soft basal shoots in spring. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer. Division in spring or autumn. Large divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Easily grown in ordinary garden soil so long as it is not too dry[1, 200]. Requires a moist soil and a sunny position[200]. This species prefers a light dry alkaline soil[238]. Plants are hardy to about -10°C[260] and should succeed outdoors in most parts of Britain. A polymorphic species[200]. A good bee plant[200]. Subject to mildew in dry summers[200].

6.2.431 Polygala tenuifolia

Yuan Zhi
5 tlin 9 cyuc 1 kcaak 0 tcan 3 dwat 0.2 m hkuc
hnmihmtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliw hpa7tmwatli xre7t hjonli

drutta Polygala tenuifolia is a PERENNIAL growing to 0.2 m (0ft 8in) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been seen for this species, at least one member of this genus is said to be

poisonous in large quantities.

kcakta Edible Parts: Leaves RootEdible Uses: Young leaves - cooked[105, 177, 179]. Root - cooked[105, 177]. The core is removed and the root is boiled in several changes of water[179].

dwatta Cardiotoxic Expectorant Haemolytic Kidney Sedative TonicYuan Zhi contains triterpenoid saponins, these promote the clearing of phlegm from the bronchial tubes. The plant is used mainly as an expectorant and stimulant to treat bronchial asthma, chronic bronchitis and whooping cough[254]. The root is antibacterial, cardiotoxic, cerebrotonic, expectorant, haemolytic, hypotensive, sedative and tonic[116, 147, 176, 218]. It acts mainly as a tonic for the heart and kidney energies[238]. It is taken internally in the treatment of coughs with profuse phlegm, bronchitis, insomnia, palpitations, poor memory, anxiety, depression and nervous tension[238]. Externally it is used to treat boils and carbuncles[147, 238]. The root is harvested in the autumn and dried for later use[238]. The leaves are used as a tonic for the kidneys[218].

nrakta E. Asia - Korea, Mongolia, Manchuria. ksacta Hillsides, roadsides and meadows[147]. Dry meadows and stony slopes[238].

propta Seed - sow spring or autumn in a cold frame[214]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division. Cuttings of young shoots in a frame in late spring[1].

nwatta Prefers a moderately fertile moisture-retentive well-drained soil, succeeding in full sun if the soil remains moist throughout the growing season, otherwise it is best in semi-shade[200, 238]. Dislikes shade according to another report. Plants are hardy to at least -15°C[238].

6.2.432 Ranunculus kochii

5 tlin 9 cyuc 1 kcaak 0 tcan 0 dwat 0.1 m hkuc
htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliw hpa7tmwatli xre7t hjonli

drutta Ranunculus kochii is a PERENNIAL growing to 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from April to June. The species is hermaphrodite (has both male and female organs) and is pollinated by insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista Although no specific record of toxicity has been found for this plant, many if not all members of this genus are poisonous. These toxins can be destroyed by heat or by drying[4, 10, 13, 19, 62, 65]. Many if not all plants in this genus also have a strongly acrid juice that can cause blistering to the skin[65, 183].

kcakta Edible Parts: Flowers StemEdible Uses: Young stems[177]. No more details are given. Petals[177]. No more details are given. Caution is advised for both these uses, see the notes above on toxicity.

nrakta W. Asia - Turkey, Iraq, Iran. ksacta Rocky slopes near melting snow, to 3000 metres in Turkey[93].

propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring.

nwatta Prefers a moist loamy soil[1]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

6.2.433 Sedum stenopetalum

Wormleaf Stonecrop
5 tlin 9 cyuc 1 kcaak 0 tcan 1 dwat 0.2 m hkuc
htut cyutli hgtakytucup hwicli hrasjlutnyik hpa7tli flatprikliw hpa7tmwatli fyfxxre7t hjonli

drutta Sedum stenopetalum is an evergreen Perennial growing to 0.2 m (0ft 8in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from June to July, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by insects. The plant is

self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcasta Although not poisonous, if large quantities of this plant are eaten it can cause a stomach upset[62, 85].

ksakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked. Best used when young[85].

dwatta VDAan infusion of the whole plant has been used in the treatment of venereal diseases[257].

nrakta Western N. America - South Dakota to Alberta, Nebraska, Oregon and California. ksakta Open rocky slopes and bluffs, rock crevices, in gravel and talus, also in grassland and sagebrush desert, usually in well-drained very dry places and often in ponderosa pine forests[83].

propta Seed - surface sow in spring in well-drained soil in a sunny position in a greenhouse. Do not allow the soil to dry out. Prick out the seedlings into individual pots when they are large enough to handle. If sufficient growth is made, it is possible to plant them out during the summer, otherwise keep them in a cold-frame or greenhouse for their first winter and plant them out in early summer of the following year[K]. Division is very easy and can be carried out at almost any time in the growing season, though is probably best done in spring or early summer. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer. Bulbils harvested in late summer and planted out immediately.

nwatta Succeeds in most soils[188] but prefers a fertile well-drained soil in a sunny position[200]. Established plants are very drought tolerant[200], they grow well in dry soils and can be grown on a wall[200]. Plants are viviparous, producing bulbils in their leaf axils at flowering time[83, 200]. All members of this genus are said to have edible leaves, though those species, such as this one, that have yellow flowers can cause stomach upsets if they are eaten in quantity[62, 85]. Plants in this genus seem to be immune to the predations of rabbits[233].

6.2.434 Stachys officinalis

Wood Betony, Common hedge-nettle, Betony, Woundwort
5 tin 10 cyuc 1 ckak 2 tcan 2 dwat 0.6 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyikfrp hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Stachys officinalis is a PERENNIAL growing to 0.6 m (2ft) by 0.5 m (1ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to September, and the seeds ripen from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

ksakta Edible Parts: Edible Uses: TeaThe leaves and flowering tops make a good tea substitute. Refreshing and aromatic[21, 100, 183], it has all the good qualities of tea without the negative ones[4].

tcanta DyeA fine yellow dye is obtained from the leaves[4].

dwatta Anthelmintic Antiseptic Astringent Carminative Cathartic Cholagogue Digestive Diuretic Emetic Emmenagogue Expectorant Homeopathy Nervine Sedative Sternutatory Tonic VulneryWood betony was at one time commonly used as a medicinal plant in the treatment of a wide range of disorders, especially as a nerve and tonic for treating maladies of the head and as an external application to wounds[4, 7, 238]. It also stimulates the digestive system and the liver, having an overall tonic effect upon the body[254]. Wood betony is much less used nowadays, and more often forms part of a mixture of herbs[4]. The whole plant is collected when in flower in the summer and can be dried for later use[4, 254]. It is anthelmintic, antiseptic, astringent, carminative, mildly cathartic, cholagogue, digestive, diuretic, mildly emetic, emmenagogue, expectorant, nervine, sedative, sternutatory, tonic and vulnerary[4, 9, 14,

21, 165, 218]. It is taken in the treatment of 'frayed nerves', pre-menstrual complaints, poor memory and tension[254]. It can be taken in combination with herbs such as comfrey, Symphytum officinale, and lime flowers, Tilia species, to treat sinus headaches and congestion[254]. Wood betony can be taken on its own, or with yarrow, Achillea millefolium, to staunch nosebleeds[254]. A pinch of the powdered herb will provoke violent sneezing and it has been used as part of a herbal snuff mixture in the treatment of headaches[4]. A homeopathic remedy is made from the fresh plant[9]. It is used in the treatment of asthma and excessive perspiration[9].

nrakta Europe, including Britain, south and east from Sweden to Spain, Italy, Greece and the Caucasus. ksakta Grassland, hedgebanks, heath and open woods, avoiding calcareous soils[9, 17].

propta Seed - sow spring in a cold frame. Prick out the seedlings into individual pots once they are large enough to handle and plant them out in the summer. Division in spring. Very easy, the plant can be successfully divided at almost any time of the year. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Landscape Uses:Border, Ground cover, Specimen. Prefers a light moist neutral to acid soil in sun or light shade[7, 17, 238]. A characteristic plant of healthy roadside banks on heavy soils[187]. Hardy to at least -25°C[187]. At one time bugle was often cultivated for its medicinal virtues, though it is now little used[4]. There are some named varieties selected for their ornamental value[188]. An excellent bee plant[24]. Special Features:Attractive foliage, Fragrant foliage, Not North American native, Invasive, Naturalizing, Suitable for cut flowers, Suitable for dried flowers. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [2-1].

6.2.435 Limonium tetragonum

5 tin 9 cyuc 1 ckak 0 tcan 0 dwat 0.5 m hkuc
htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Limonium tetragonum is a BIENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

ksakta Edible Parts: LeavesEdible Uses: Young leaves - cooked[105, 177].

nrakta E. Asia - Japan, Korea, Manchuria. ksakta Sandy places by the sea, central and southern Japan[58].

propta Seed - sow spring in a greenhouse. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer.

nwatta Requires a well drained soil and a sunny position[200].

6.2.436 Sedum lanceolatum

Spearleaf Stonecrop, Subalpine stonecrop
5 tin 9 cyuc 1 ckak 0 tcan 1 dwat 0.2 m hkuc
htut cyutli hgatkuyctcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyfxtre7t hjonli

drutta Sedum lanceolatum is an evergreen Perennial growing to 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the

propta Seed - best sown outdoors, or in a cold frame, as soon as it is ripe[200]. Stratify stored seed for 3 weeks at 1°C and sow in spring[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Softwood cuttings, 10cm long, in a frame. They should be taken in late spring to early summer before the leaves are fully developed[200]. Root cuttings in winter[200].

nwatta Landscape Uses:Specimen, Street tree. Prefers a good moist loamy soil and a sunny position that is not exposed[1, 11]. Tolerates heavy clay soils[200]. Very resistant to atmospheric pollution[188]. Plants become chlorotic on shallow alkaline soils[202]. Plants are hardy to about -15°C, probably more in continental climates[200], they grow best in areas with hot summers[188]. Protect plants from late frosts when they are young[200]. A very ornamental plant[1], it is fast-growing in the wild where it often flowers when only 6 - 8 years old[229]. The sweetly-scented flowers are borne in forked panicles at the end of branches[245]. There are some named varieties selected for their ornamental value[188, 200, 202]. The trees transplant easily[200]. The crushed foliage has an unpleasant smell[202]. Another report says that the leaves are attractively scented when bruised[245]. Plants in this genus are notably resistant to honey fungus[200]. Special Features:North American native, Naturalizing, All or parts of this plant are poisonous, Blooms are very showy.

6.2.474 Hedera helix

Ivy, English ivy, Algerian ivy, Baltic Ivy, Common Ivy
5 tin 11 cyuc 0 ckak 4 tcan 3 dwat 15 m hkuc
pcimhmimhtut cyutli hgattucp[ha]7n hwicli hyhshrasjlutnyikfrp hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Hedera helix is an evergreen Climber growing to 15 m (49ft) by 5 m (16ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf all year, in flower from October to November, and the seeds ripen from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. It can tolerate atmospheric pollution.

pcasta The plant is said to be poisonous in large doses[7, 10, 65, 76] although the leaves are eaten with impunity by various mammals without any noticeable harmful effects. The leaves and fruits contain the saponic glycoside hederagenin which, if ingested, can cause breathing difficulties and coma[274]. It has caused dermatitis with blistering and inflammation. This is apparently due to the presence of polyacetylene compounds[274].

ksakta Although they are almost certainly not edible, there is a report that the seeds contain 16.2% protein and 35.1% fat[218].

tcanta Dye Hair Hedge Hedge Parasiticide Pollution Soap WoodA yellow and a brown dye are obtained from the twigs[46, 61]. A decoction of the leaves is used to restore black fabrics[7, 46, 53] and also as a hair rinse to darken the hair[7, 53]. If the leaves are boiled with soda they are a soap substitute for washing clothes etc[61]. An excellent ground cover for shady places, succeeding even in the dense shade of trees[197, 208]. A very effective weed suppresser[190]. The cultivars 'Hibernica', 'Lutzi' and 'Neilsonii' have been especially mentioned[190]. Plants can be grown along fences to form a hedge. The variety 'Digitata' is very useful for this[200]. Plants have been grown indoors in pots in order to help remove toxins from the atmosphere. It is especially good at removing chemical vapours, especially formaldehyde[259]. The plants will probably benefit from being placed outdoors during the summer[259]. The wood is very hard and can be used as a substitute for Buxus sempervirens (Box), used in engraving etc[46, 61]. Another report

says that the wood is very soft and porous and is seldom used except as a strop for sharpening knives[4].

dwatta Antibacterial Antirheumatic Antiseptic Antispasmodic Astringent Cathartic Diaphoretic Emetic Emmenagogue Parasiticide Skin Stimulant Vasoconstrictor Vasodilator Vermifugely is a bitter aromatic herb with a nauseating taste[238]. It is often used in folk herbal remedies[218], especially in the treatment of rheumatism and as an external application to skin eruptions, swollen tissue, painful joints, burns and suppurating cuts[9, 238]. Recent research has shown that the leaves contain the compound 'emetine', which is an amoebicidal alkaloid, and also triterpene saponins, which are effective against liver flukes, molluscs, internal parasites and fungal infections[238]. The leaves are antibacterial, antirheumatic, antiseptic, antispasmodic, astringent, cathartic, diaphoretic, emetic, emmenagogue, stimulant, sudorific, vasoconstrictor, vasodilator and vermifuge[7, 218, 238]. The plant is used internally in the treatment of gout, rheumatic pain, whooping cough, bronchitis and as a parasiticide[238]. Some caution is advised if it is being used internally since the plant is mildly toxic[7]. Excessive doses destroy red blood cells and cause irritability, diarrhoea and vomiting[238]. This plant should only be used under the supervision of a qualified practitioner[238]. An infusion of the twigs in oil is recommended for the treatment of sunburn[4]. The leaves are harvested in spring and early summer, they are used fresh and can also be dried[9]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Hedera helix for cough, bronchitis (see [302] for critics of commission E).

nrakta Europe, including Britain, south and east to the Mediterranean and Iran. ksakta Woodlands, hedges and shady places, climbing up trees, walls etc and clambering over the ground[7]. Found on all types of soils[7].

propta Seed - remove the flesh, which inhibits germination, and sow the seed in spring in a cold frame[113]. Four weeks cold stratification will improve germination[113]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the cold frame for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, July/August in a shady position in a frame. Good percentage[78]. Cuttings of mature wood, 12cm long, November in a cold frame[78]. Layering. Plants often do this naturally.

nwatta Landscape Uses:Cascades, Container, Erosion control, Ground cover, Massing. Ivy is a very easily grown plant that dislikes waterlogged, very dry or very acid soils but otherwise succeeds in all soil types[1, 17, 238]. It grows well in heavy clay soils. Prefers some lime in the soil. Tolerates very dense shade[24, 31], though it may not flower in such a position[K]. The plant is very hardy and tolerant of atmospheric pollution[4]. Established plants are drought tolerant[190]. A very ornamental and hardy plant[190], it tolerates temperatures down to about -25°C[184]. There are many named varieties[190], the variegated forms are less hardy than the species and also require more light[238]. Ivy is a rampant climbing plant, clinging by means of aerial roots and often trailing on the ground in woods and hedges[186]. It is of benefit rather than harm when growing on a wall because it keeps the wall dry and acts as an insulation[11, 24]. It does not damage the structure of a wall. Similarly, it does not harm large trees when climbing into them, though it can shade out smaller and ailing trees[200]. It is not a parasitic plant, but instead obtains all its nutrient from the sun and the soil[186]. A very good plant for wild-life, it provides dense shelter for birds, spiders etc, an abundant late supply of nectar for insects and a supply of seeds for winter food[4, 24, 186]. It is a food plant for the larvae of many species of butterfly[24, 30]. A very variable plant, there are many named varieties. This species is notably resistant to honey fungus[200]. Special Features: Attractive foliage, Not North American native, Naturalizing, All or parts of this plant are poisonous, Inconspicuous flowers or blooms. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

in the shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

tcanta Incense Shelterbelt WoodThe leaves are very aromatic and are used as incense sticks[46, 61, 272]. A fairly wind-tolerant tree, it can be used in shelterbelt plantings[200]. Wood - light, fragrant, fine grained[46, 61]. The wood is strongly rot resistant, easily worked, and is used for buildings, bridges, ships, lamp posts, furniture, utensils, and paper manufacture[1, 46, 61, 266]. The wood can be used as a substitute for Deal[146]. Old wood that has been buried in the soil turns a dark green and is then much esteemed[46, 61].

dwatta Depurative VDA n oil and/or a resin from the plant is depurative and also used in the treatment of gonorrhoea[218].

nrakta E. Asia - China, Japan. ksacta Mountains and hills in areas of higher rainfall in S. and C. Japan[58, 200]. Rarely spontaneous[58]. Forests on deep, well-drained soils subject to warm, moist conditions, 1100 - 2500 metres[266].

propta Seed - sow early spring in a cold frame. The seed germinates better if given a short cold stratification for 2 - 3 weeks at 4°c and is then placed in a warm position[164]. Germination usually takes place within 3 - 9 weeks at 15°c[164]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. An alternative is to plant out the young trees into an outdoor nursery bed when they are about 8cm tall and grow them on for a couple of years before planting them into their permanent positions in late autumn or early spring[164]. Cuttings in the autumn in a sandy soil in a cold frame.

nwatta Landscape Uses:Screen, Specimen, Street tree. Prefers a deep rich moist alluvial soil and a sheltered position in full sun[1, 11, 164]. Tolerates very acid to somewhat alkaline soils, but becomes chlorotic on shallow soils over chalk[200]. Plants are fairly wind-tolerant[200]. A very ornamental tree[1], it has been widely cultivated as a forestry tree for several centuries in Japan and there are many strains each adapted to the various local conditions[11]. Many forms, almost all of them dwarf, have also been selected for their ornamental value[185, 200]. A fast-growing tree on deep, well-drained soils in montane areas with a warm, moist climate, but intolerant of poor soils and cold, drier climates[266]. Occasionally planted for timber in Europe[50], trees do not generally do as well as could be expected in Britain, the best specimens are to be found in the west, especially in the south-west[11]. Trees can grow quite fast in the western part of the country with annual increases of 1 metre or more[185]. New growth takes place from early June to August[185]. Growth decreases rapidly with age, virtually ceasing when the tree reaches 25 metres[185]. This species is notably resistant to honey fungus[200]. Unlike most conifers, this species can be coppiced[81]. Special Features: Attractive foliage, Not North American native, Inconspicuous flowers or blooms.

6.2.472 Fraxinus latifolia

Oregon Ash

5 tlin 9 cyuc 0 kcaak 0 tcan 1 dwat 20 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprklwix hpa7tmwatli nyanhjen hjonli

drutta Fraxinus latifolia is a deciduous Tree growing to 20 m (65ft 7in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in April, and the seeds ripen in October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerate maritime exposure. It can tolerate atmospheric pollution.

tcanta Shelterbelt WoodA fairly wind resistant tree, it can be grown as part of a shelterbelt planting[200]. Wood - hard, brittle, light, coarse grained. A valuable timber tree, it is largely used for making furniture, the interiors of buildings, cooperage etc, and as a fuel[46, 61, 82, 171].

dwatta Anthelmintic Febrifuge VulneraryThe pulverised fresh roots were used by some native North American Indian tribes to treat serious wounds[213, 257]. A cold infusion of the twigs has been used to treat fevers[257]. The bark is anthelmintic[257].

nrakta Western N. America - Washington to California. ksacta Rather deep, fertile, usually moist soils in the neighbourhood of streams near the coast[60, 82].

propta The seed is best harvested green - as soon as it is fully developed but before it has fully dried on the tree - and can then be sown immediately in a cold frame[80]. It usually germinates in the spring[80]. Stored seed requires a period of cold stratification and is best sown as soon as possible in a cold frame[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant them out into their permanent positions or a nursery bed in late spring or early summer of the following year. If you have sufficient seed then it is possible to sow it directly into an outdoor seedbed, preferably in the autumn. Grow the seedlings on in the seedbed for 2 years before transplanting either to their permanent positions or to nursery beds.

nwatta Prefers a deep loamy soil, even if it is on the heavy side[1, 200]. Most members of this genus are gross feeders and require a rich soil[11, 200]. Plants succeed when growing in exposed positions[200] and also in alkaline soils[11]. They tolerate atmospheric pollution[200]. A fast growing tree for its first 75 years in the wild, it then grows slowly reaching a maximum age of 250 years[229]. This species is closely related to *F. pennsylvanica*[200]. Dioecious. Male and female plants must be grown if seed is required.

6.2.473 Catalpa bignonioides

Indian Bean Tree, Southern catalpa

5 tlin 9 cyuc 0 kcaak 0 tcan 2 dwat 15 m hkuc htut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprklwix hpa7tmwatli xre7t hjonli

drutta Catalpa bignonioides is a deciduous Tree growing to 15 m (49ft) by 12 m (39ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to July, and the seeds ripen from October to December. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. It can tolerate atmospheric pollution.

pcista The roots are highly poisonous[254].

tcanta WoodA fast-growing tree with an extensive root system, it has been planted on land that is subject to landslips or erosion in order to stabilize the soil[7]. Wood - coarse and straight-grained, soft, not strong, moderately high in shock resistance, very durable in the soil. It weighs about 28lb per cubic foot. It is highly valued for posts and fencing rails, and is also used for interior finishes, cabinet work etc[46, 61, 82, 227].

dwatta Antidote Antiseptic Cardiac Laxative Malaria Ophthalmic Sedative VermifugeA tea made from the bark has been used as an antiseptic, antidote to snake bites, laxative, sedative and vermifuge[222]. As well as having a sedative effect, the plant also has a mild narcotic action, though it never causes a dazed condition[7]. It has therefore been used with advantage in preparations with other herbs for the treatment of whooping cough in children, it is also used to treat asthma and spasmodic coughs in children[7, 254]. The bark has been used as a substitute for quinine in treating malaria[254]. The leaves are used as a poultice on wounds and abrasions[222]. A tea made from the seeds is used in the treatment of asthma and bronchitis and is applied externally to wounds[222]. The pods are sedative and are thought to have cardioactive properties[222]. Distilled water made from the pods, mixed with eyebright (*Euphrasia officinalis*) and rue (*Ruta graveolens*) is a valuable eye lotion in the treatment of trachoma and conjunctivitis[7].

nrakta South-eastern N. America - Florida, Alabama, Missouri and Louisiana. ksacta Rich moist soils by the sides of streams and rivers[229].

shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure.

pcista Although not poisonous, if large quantities of this plant are eaten it can cause a stomach upset[62, 85].

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked[60].

dwatta Birthing aid LaxativeThe plant is laxative[257]. An infusion of the stems, leaves and flowers has been taken to clean out the womb after childbirth[257].

nrakta North-western N. America. ksacta Open exposed places, usually on rocks or on gravelly or rocky soil from sea-level to the sub-alpine zone[60].

propta Seed - surface sow in spring in well-drained soil in a sunny position in a greenhouse. Do not allow the soil to dry out. Prick out the seedlings into individual pots when they are large enough to handle. If sufficient growth is made, it is possible to plant them out during the summer, otherwise keep them in a cold-frame or greenhouse for their first winter and plant them out in early summer of the following year[K]. Division is very easy and can be carried out at almost any time in the growing season, though is probably best done in spring or early summer. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Succeeds in most soils[188] but prefers a fertile well-drained soil in a sunny position[200]. Established plants are drought tolerant[190, 200]. Succeeds when grown on a wall[200]. Hardy to at least -15°c[200]. A very polymorphic species[60], it is closely related to *S. stenopetalum*, but this species is not creeping[200]. All members of this genus are said to have edible leaves, though those species, such as this one, that have yellow flowers can cause stomach upsets if they are eaten in quantity[62, 85]. Plants in this genus seem to be immune to the predations of rabbits[233].

6.2.437 Anemone flaccida

5 tlin 9 cyuc 1 kcaak 0 tcan 0 dwat 0.1 m hkuc pcmihmm cyutli tcup hwicli hrasjlutnyik hpa7tli flatprklwix hpa7tmwatli fyixre7t hjonli

drutta Anemone flaccida is a PERENNIAL growing to 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

pcista Although no specific mention has been seen for this species, many members of this genus contain protoanemonin, an irritating acrid oil that is an enzymatic breakdown product of the glycoside ranunculin. While protoanemonin can cause severe topical and gastrointestinal irritation, it is unstable and changes into harmless anemonin when plants are dried or heated[4, 10, 19, 65, 270].

kcakta Edible Parts: LeavesEdible Uses: Leaves and stems - cooked[46, 61, 177]. Some caution is advised, see the notes above on toxicity.

nrakta E. Asia - N. and W. China, Japan. ksacta Moist shaded places along streams and ravines in foothills[58] in loose peaty soils[187].

propta Seed - best sown in a cold frame as soon as it is ripe in the summer[1]. Surface sow or only just cover the seed and keep the soil moist. Sow stored seed as soon as possible in late winter or early spring. The seed usually germinates in 1 - 6 months at 15°c[133]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for at least their first year. When the plants are large enough, plant them out in the spring. Division in late summer after the plant dies down.

nwatta Succeeds in ordinary garden soil but prefers a woodland soil[1]. Prefers a moist peaty soil in some shade[187]. Plants succeed in maritime gardens[233]. Hardy to at least -20°c[187]. Plants seem to be immune to the predations of rabbits[233]. A greedy plant, inhibiting

the growth of nearby plants, especially legumes[54]. A good woodland plant[1, 187].

6.2.438 Centaurea solstitialis

St. Barnaby's Thistle, Yellow star-thistle
5 tlin 9 cyuc 1 kcaak 0 tcan 1 dwat 0.6 m hkuc htut cyutli hgatkuyctcup hwicli hyishrasjlutnyik hpa7tli flatprklwixliip hpa7tmwatli fyifxre7t hjonli

drutta Centaurea solstitialis is a ANNUAL/BIENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista There is a report that the plant causes brain lesions and a nervous syndrome called 'chewing disease' in horses[274].

kcakta Edible Parts: LeavesEdible Uses: The plant is eaten as a vegetable[100]. The part used is not specified.

dwatta LithontripicThe powdered seed is used as a remedy for stone[4]. The powdered root is said to be a cure for fistula and gravel[4].

nrakta S. Europe to W. Asia. Occasionally established in S. and E. England[17]. ksacta Cultivated land and waste ground[100].

propta Seed - sow April in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in the summer. If you have sufficient seed it can be sown in situ in the spring, and an autumn swing in situ might also be worth trying.

nwatta Succeeds in ordinary garden soil[1, 200]. Prefers a well-drained fertile soil and a sunny position[200]. Tolerates dry, low fertility and alkaline soils[200]. A good bee and butterfly plant the flowers are rich in nectar[171]. Members of this genus are rarely if ever troubled by browsing deer[233].

6.2.439 Pinellia ternata

Ban Xia, Crowddipper
5 tlin 9 cyuc 1 kcaak 0 tcan 3 dwat 0.2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprklwix hpa7tmwatli xre7t hjonli

drutta Pinellia ternata is a CORM growing to 0.2 m (0ft 8in) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The plant is toxic[147]. This report probably refers to the presence of calcium oxylate. This is toxic and if consumed makes the mouth and digestive tract feel as though hundreds of needles are being stuck into it. However, calcium oxylate is easily destroyed by thoroughly cooking or drying the plant[172].

kcakta Edible Parts: RootEdible Uses: Root[177]. The tuber is about 12mm in diameter[266]. No more details of edibility are given in these reports but caution is advised since the fresh root is toxic[238]. The toxins can be destroyed by thoroughly drying, or very well cooking the root[K].

dwatta Antiemetic Antiphlogistic Cancer Expecto- rant Febrifuge Siagogogue StypticThe root of ban xia is antiemetic, antiphlogistic, expectorant, febrifuge, siagogogue and styptic. It also strengthens the spleen[147, 174, 176, 178, 279]. Modern research has shown that this remedy is very effective in controlling nausea and vomiting[238]. It is also an ingredient of a Chinese prescription for removing gallstones without surgery, a process that usually causes severe nausea[238]. The root is also used internally in the

treatment of coughs with thin watery phlegm and gastritis[238]. The fresh root is extremely acrid and contains toxins, these are neutralized upon drying or by soaking in tea or vinegar[238]. The root is harvested in the summer and dried for later use, it should not be used fresh[174, 238]. Extracts of the plant have been shown to have analgesic, antiemetic, anticancer and sedative activity[218].

nrakta E. Asia - China, Japan, Korea. ksacta Cultivated fields and roadsides all over Japan[58]. Shady and damp grass thickets on mountain sides and stream edges[147].

propta Seed - we have no information but suggest sowing the seed in a cold frame as soon as it is ripe if this is possible otherwise in early spring. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division of offsets as new growth begins in spring[238]. Bulbils from the leaf axils can be potted up in late summer and be planted out in late spring[238].

nwatta An easily grown when given a rich soil, it requires plenty of water in the growing season[1]. Succeeds in full sun or partial shade[188]. This species is cultivated as a medicinal plant in China[178]. Plants produce bulbils in their leaf axils and when growing in suitable conditions can become invasive[188, 238]. The plants can be naturalized in woodland[1].

6.2.440 Rhodiola tibetica

5 tlin 9 cyuc 1 kcaak 0 tcan 0 dwat 0.3 m hkuc

htut cyutli hgtakuyctcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli nyanhjen hjonli

drutta Rhodiola tibetica is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August, and the seeds ripen from August to September. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

ksacta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked[105].

nrakta E. Asia - Himalayas. ksacta Alpine meadows with occasional summer rain, but under snow for much of the year[145]. Stony slopes on the sides of ravines at elevations of 4100 - 5400 metres[266].

propta Seed - surface sow spring in well-drained soil in a sunny position in a greenhouse. Do not allow the soil to dry out. Prick out the seedlings into individual pots when they are large enough to handle, and grow them on in the greenhouse for their first winter. Plant out in early summer of the following year. Division in spring or early summer. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Prefers a fertile well-drained soil in a sunny position[200]. Established plants are drought tolerant[200]. This species is closely related to *R. quadrifida*[1]. The flowers of this species are dark purple[1]. All members of this genus are said to have edible leaves, though those species that have yellow flowers can cause stomach upsets if they are eaten in quantity[62, 85]. Dioecious, male and female plants must be grown if seed is required.

6.2.441 Cochlearia danica

Danish Scurvy Grass

5 tlin 9 cyuc 1 kcaak 0 tcan 1 dwat 0.2 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli prikliwishsom hpa7tmwatli fyifxre7t hjonli

drutta Cochlearia danica is a ANNUAL growing to 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to June, and the seeds

ripen from June to August. The species is hermaphrodite (has both male and female organs). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: neutral and basic (mildly alkaline) soils and can grow in saline soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerate maritime exposure.

ksacta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked[100, 105, 177]. Used as a flavouring in salads, it is considered to be superior to *C. officinalis*[183]. The leaves are rich in vitamin C[100], though very few people will actually enjoy the pungent flavour[K].

dwatta Antiscorbutic Vitamin CThe leaves are a rich source of vitamin C and are used as an antiscorbutic[100].

nrakta Coastal regions of Europe, including Britain, from Norway to Atlantic Spain and Portugal. ksacta Sandy and rocky shores, walls and banks by the sea and along railway lines, avoiding acid soils[17].

propta Seed - sow spring or autumn in situ. Germination usually takes place within 2 - 3 weeks at 15°c[164].

nwatta Prefers a damp well-drained soil. Avoids acid soils in the wild. Prefers a sandy or gritty well-drained soil[200]. Hybridizes with *C. officinalis*[17].

6.2.442 Plantago asiatica

Che Qian Zi

5 tlin 9 cyuc 1 kcaak 2 tcan 3 dwat 0.5 m hkuc

hmmihmtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta Plantago asiatica is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

ksacta Edible Parts: Leaves SeedEdible Uses: Young leaves - raw or cooked[218]. Rather fibrous, unless they are very young, they have a slightly bitter flavour[K].

tcanta Dynamic accumulator.

dwatta Antibacterial Antinflammatory Antiseptic Antitussive Cardiac Diuretic Expectorant Haemostatic LaxativeThe leaves and the seed are anti-inflammatory, antiseptic, antitussive, cardiac, diuretic, expectorant, haemostatic. Assists the repair of joints[174, 176, 238]. The seed is used internally in the treatment of a variety of ailments including asthma, bladder problems, bronchitis, fever, hypertension and rheumatism[218, 238, 279]. The leaves are also used for these purposes, though they are considered to be less powerful than the seed[218]. The leaves can be harvested at any time in the growing season, and are used fresh or dried[238]. A decoction of the roots is used in the treatment of coughs[218]. Plantain seeds contain up to 30% mucilage which swells up in the gut, acting as a bulk laxative and soothing irritated membranes[238]. Sometimes the seed husks are used without the seeds[238]. Extracts of the plant have antibacterial activity[218].

nrakta E. Asia - China, Japan, Korea. ksacta Woods and waste ground in lowland and mountains all over Japan[58].

propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in early summer A sowing can be made outdoors in situ in mid to late spring if you have enough seeds.

nwatta Succeeds in any moderately fertile soil in a sunny position[200]. This species is hardy to at least -15°c[238]. Closely related to *P. major* and included as a sub-species of that plant by some botanists[238].

6.2.443 Sedum oreganum

Oregon stonecrop

5 tlin 9 cyuc 1 kcaak 0 tcan 0 dwat 0.2 m hkuc

htut cyutli hgtakuyctcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta Chamaecyparis lawsoniana is an evergreen Tree growing to 25 m (82ft) by 4 m (13ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from March to April, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

tcanta Broom Hedge Hedge Resin WoodPlants can be grown as a tall hedge[29, 75, 200] They are very tolerant of clipping so long as this does not extend into the brown barked wood since trees cannot regenerate from this[200]. Any trimming should be done in the summer[200]. Certain dwarf forms can be used for ground cover, the cultivars 'Knoefeldensis', 'Nidiformis' and 'Tamariscifolia' have been recommended[208]. The branches have been used to make brooms[257]. Wood - very close-grained, hard, strong, durable, easily worked, light, abounding in fragrant resin, acid resistant. One of the world's finest timbers, it is widely used for flooring, fencing, making boats etc[46, 61, 82, 171]. It is now in short supply due to over-harvesting without replanting[200].

dwatta DiureticThe resin is a powerful diuretic[46, 61, 82].

nrakta Western N. America - Oregon to California. Locally naturalized in S. Europe[50]. ksacta Usually scattered in moist groves on moist slopes and canyons, often on serpentine soils, below 1500 metres. Seldom more than 50 kilometres from the coast[71, 82].

propta Seed - sow March/April in a seedbed outdoors[78]. The seed is best sown in pots in a frame[K]. Seed can take 18 months to germinate. One month warm then one month cold stratification has produced good results[113]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter, planting them out in late spring after the last expected frosts. Cuttings in late summer or autumn in sandy soil in a cold frame[1, 11, 200]. Difficult, it may be best done in late winter to early spring[113].

nwatta Landscape Uses:Hedge, Screen, Specimen. Succeeds in most soils and situations, but prefers a moist deep loamy soil and a sheltered position[1, 11]. Grows well in heavy clay soils. Survives on dry alkaline soils[200]. Growth of trees is hardly affected by a lack of phosphate in the soil. Plants are moderately shade tolerant, especially when young[81, 200]. Plants are tolerant of atmospheric pollution according to one report[200], whilst another says that they do not do well in a polluted atmosphere[1]. A fairly wind tolerant plant, but it does not like severe maritime exposure[75]. Plants are susceptible to wind burn and recover variably[75]. This species is hardy to about -25°c[200]. A fairly long-lived tree in the wild with specimens 500 - 600 years old[229]. It is a very valuable timber tree in N. America and it is sometimes cultivated as a forestry tree in Britain, where it occasionally self-sows[1, 11]. It establishes well and grows quickly. New shoots can make 1 metre in a year but trees rarely maintain that rate and 30cm is nearer the average[185]. New growth starts very slowly in April, speeds up in June and ceases in September[185]. A very uniform species in the wild[200], in cultivation it is polymorphic and there are many named varieties[1, 185, 200]. The crushed foliage has a pungent smell[245]. Favoured by many birds for roosting, providing high cover and especially for nesting, large specimens of this tree help to attract songbirds to the garden[200]. Trees are notably susceptible to honey fungus[200]. Special Features: Attractive foliage, North American native, Inconspicuous flowers or blooms.

6.2.470 Betula utilis

Indian Paper Birch, Whitebarked Himalayan Birch, Jacquemontii Birch

5 tlin 6 cyuc 0 kcaak 3 tcan 2 dwat 20 m hkuc

hmmihmtut cyutli tcup hwicli hrasjlutnyikrip hpa7tli flatprikliwis hpa7tmwatli hjonli

drutta Betula utilis is a deciduous Tree growing to 20 m (65ft 7in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in flower in April, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure.

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

tcanta Incense Paper Waterproofing WoodA paper is made from the inner bark[46, 51, 61]. The outer bark can be carefully peeled off the tree (this does not harm the tree) and used as a paper[158]. The outer bark can also be used as a waterproofing and for roofing houses[51, 146, 272]. The bark is sometimes used as an incense[272]. Wood - tough, even grained, moderately hard, elastic. Used for construction[51, 146, 158, 272].

dwatta Antiseborrheic Antiseptic Carminative UrinaryAn infusion of the bark is antiseptic and carminative[240, 243, 272]. It has been used in the treatment of hysteria and jaundice[240, 243, 272]. It is applied as drops to the ears to relieve earache[272]. A paste made from the bark is used as a poultice on cuts, wounds and burns[272]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Betula species for infections of the urinary tract, kidney and bladder stones, rheumatism (see [302] for critics of commission E).

nrakta E. Asia - Himalayas to S.W. China. ksacta Forests at the upper height limit of tree growth[51], rarely found below 3000 metres[146]. Moist hillsides at elevations of 2000 - 4000 metres in Nepal[272].

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

nwatta Landscape Uses:Specimen. Succeeds in a well-drained loamy soil in a sheltered position[11, 200]. Grows well in heavy clay soils. Dislikes wet soils[200]. Shade tolerant[200]. Plants are showing good wind-resistance on our Cornish trial ground[K]. Hybridizes freely with other members of this genus[50]. A good plant to grow near the compost heap, aiding the fermentation process[20]. Trees are notably susceptible to honey fungus[200]. Special Features: Not North American native, Inconspicuous flowers or blooms.

6.2.471 Cryptomeria japonica

Japanese Cedar, Sugi

5 tlin 8 cyuc 0 kcaak 0 tcan 1 dwat 20 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatprikliwis hpa7tmwatli hjonli

drutta Cryptomeria japonica is an evergreen Tree growing to 20 m (65ft) by 8 m (26ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from February to March, and the seeds ripen from October to March. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It cannot grow

be dioecious, in which case male and female plants must be grown if seed is required.

6.2.467 Cedrus atlantica

Atlas Deodar, Atlantic cedar

5 tlin 9 cyuc 0 kcaak 3 tcan 2 dwat 25 m hkuc
htut cyutli hgtakuyctcup hwicli hrasjlutnyik hpa7tli flatprikli-wisslip hpa7tmwatli hjonli

drutta Cedrus atlantica is an evergreen Tree growing to 25 m (82ft) by 10 m (32ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower in September, and the seeds ripen from October to December. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

tcanta Essential Hedge Hedge Repellent WoodAn essential oil obtained from the distilled branches is used in perfumery, notably in jasmine-scented soaps[238]. The essential oil also repels insects[238]. Plants can be grown as a tall hedge[29]. Wood - fragrant and durable[238]. It is prized for joinery and veneer and is also used in construction[61, 238]. It is also used for making insect-repellent articles for storing textiles[238].

dwatta Antidandruff Antifungal Antiseptic Nerve Pectoral SkinAn essential oil obtained from the distilled branches is a good antiseptic and fungicide that stimulates the circulatory and respiratory systems and also calms the nerves[238]. The oil is also astringent, diuretic, expectorant and sedative[254]. Diluted with a carrier oil such as almond, and massaged into the skin it is used in the treatment of skin diseases, ulcers, chest infections, catarrh, cystitis and dandruff[4, 238, 254]. It is used as an inhalant for treating bronchitis, tuberculosis and nervous tension[4, 238]. An infusion of the branches can also be used[238].

nrakta N. Africa - Morocco and Algeria. ksacta Upper slopes of the Atlas mountains where there is little or no rain in the growing season but the soil is fed by the melting snow from the peaks above[200].

propta Seed - collect the cones in winter and keep in a warm room until they open[1]. Sow immediately in a cold frame[78]. One report says that a short cold stratification of one month improves germination rates[113]. Keep the seed pot moist, but be careful because the young seedlings are very prone to damp off, keep them well ventilated[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a cold frame for their first winter and plant them out into their permanent positions in late spring or early summer. Give them some protection from winter cold for their first winter or two outdoors[K]. Cuttings of terminal shoots can be tried in a frame in November but they are very difficult[113].

nwatta Thrives on most soils, being very tolerant of chalk, dry sites and of drought when it is established[11, 81, 200]. Prefers a rich loam or a sandy clay in full sun[1]. This species is more tolerant of atmospheric pollution than other members of the genus[11]. Succeeds in warm dry areas with less than 40cm of rain a year, but also in areas with cool summers and up to 200cm of rain[200]. Small trees less than 50cm tall establish much quicker and better than taller trees, those more than 2 metres tall are difficult to establish[200]. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200]. Trees grow fairly rapidly, with height gains of 60cm in a year recorded[185]. This species is cultivated for its timber in some parts of S. Europe[50]. Small male cones are formed on the lower branches of trees, whilst the larger female cones are formed on higher branches[238]. These female cones persist on the tree for 2 - 3 years before breaking up[238]. Trees are notably susceptible to honey fungus[200]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern

is fleshy. Thick or swollen - fibrous or tap root [2-1].

6.2.468 Carpinus betulus

Hornbeam, European hornbeam, Common Hornbeam, European Hornbeam

5 tlin 7 cyuc 0 kcaak 0 tcan 2 dwat 25 m hkuc
pcimhmimhtut cyutli tcup hwicli hrasjlutnyikvipr hpa7tli flatprikliwisslip hpa7tmwatli hjonli

drutta Carpinus betulus is a deciduous Tree growing to 25 m (82ft) by 20 m (65ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to May, and the seeds ripen in November. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

tcanta Dye Fuel Hedge Hedge WoodPlants can be grown as a medium to tall hedge, they retain their dead leaves throughout the winter if clipped at least once a year in late summer[11, 29, 186]. They should not be clipped in spring since they will bleed profusely[200]. A yellow dye is obtained from the bark[115]. Wood - heavy, close grained, hard, very tough, very durable, not very durable according to another report. Used for flooring, cogs, tools, piano mechanisms etc[1, 11, 13, 46, 115]. A good fuel[6].

dwatta Bach Haemostatic OphthalmicThe leaves are haemostatic[7]. They are used in external compresses to stop bleeding and heal wounds[7]. A distilled water made from the leaves is an effective eye lotion[7]. The leaves are harvested in August and dried for later use[7]. The plant is used in Bach flower remedies - the keywords for prescribing it are 'Tiredness', 'Weariness' and 'Mental and physical exhaustion'[209].

nrakta Europe, including Britain, from Sweden to the Pyrenees east to Iran in W. Asia. ksacta Woodlands and hedgerows on sandy or clay loams[17], preferring heavier soils[13].

propta Seed - best sown in an outdoors seedbed as soon as it is ripe[78]. Germination is usually good, though it may take 18 months[80]. If collected whilst still 'green' (after the seed is ripe but before it has dried fully on the plant) and sown immediately it should germinate in the following spring[80]. Grow the plants on for two years in the seedbed and then plant them out into their permanent positions in the winter. The average seed viability is around 65%[98]. Pre-treat stored seed with 4 weeks warm and 12 weeks cold stratification and sow in a cold frame[98]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame until they are at least 15cm tall before planting them into their permanent positions.

nwatta Landscape Uses:Espalier, Pest tolerant, Hedge, Superior hedge, Specimen, Street tree. Thrives in any good loam, including chalk[1, 11], it does not demand much light[186]. Prefers a deep open loam[1] and does well on damp clays[186]. Succeeds in all but the most acid soils[186]. Dormant trees are very cold tolerant, the young growth is not usually damaged by late spring frosts[186]. The trees cast a deep shade[98, 186]. A very ornamental plant[1]. Trees are shallow-rooted[7]. The hornbeam has 28 species of associated insects[24]. Trees take 10 - 20 years from seed before they produce seed[98] and about 100 years to reach maturity[186]. At one time this tree was commonly pollarded or coppiced for its wood and for fuel[11, 13, 186]. Special Features: Not North American native, Inconspicuous flowers or blooms.

6.2.469 Chamaecyparis lawsoniana

Lawson Cypress, Port orford cedar, Oregon Cedar, Port Orford Cedar, Lawson's Cypress

5 tlin 7 cyuc 0 kcaak 0 tcan 1 dwat 25 m hkuc
hmimhtut cyutli hgtakuyctcup hwicli hrasjlutnyikvipr hpa7tli flatprikliwisslip hpa7tmwatli hjonli

drutta Sedum oreganum is an evergreen Perennial growing to 0.2 m (0ft 8in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista Although not poisonous, if large quantities of this plant are eaten it can cause a stomach upset[62, 85].

ksakta Edible Parts: LeavesEdible Uses: Leaves and young shoots - raw or cooked[60, 177, 256].

tcanta Plants can be grown as a ground cover when planted about 25cm apart each way[208].

nrakta Western N. America - Oregon to Alaska. ksacta Chiefly montane on rock ledges, gravelly ridges and talus slopes[60].

propta Seed - surface sow in spring in well-drained soil in a sunny position in a greenhouse. Do not allow the soil to dry out. Prick out the seedlings into individual pots when they are large enough to handle. If sufficient growth is made, it is possible to plant them out during the summer, otherwise keep them in a cold-frame or greenhouse for their first winter and plant them out in early summer of the following year[K]. Division is very easy and can be carried out at almost any time in the growing season, though is probably best done in spring or early summer. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Succeeds in most soils[188] but prefers a fertile well-drained soil in a sunny position[200]. Established plants are drought tolerant[200]. Can be grown on a wall[200]. All members of this genus are said to have edible leaves, though those species, such as this one, that have yellow flowers can cause stomach upsets if they are eaten in quantity[62, 85]. Plants in this genus seem to be immune to the predations of rabbits[233].

6.2.444 Matricaria recutita

German Camomile

5 tlin 9 cyuc 1 kcaak 4 tcan 5 dwat 0.5 m hkuc
htut cyutli kyuctcup hwicli hyishrasjlutnyik hpa7tli flatprikli-wishsom hpa7tmwatli xre7t hjonli

drutta Matricaria recutita is a ANNUAL growing to 0.5 m (1ft 8in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from June to July, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in saline soils. It cannot grow in the shade. It prefers dry or moist soil.

pcista Allergic reactions (tongue thickening, tightness in the throat,swelling of the lips, throat and eyes, itching over the body) have been reported with German chamomile but are infrequent. Patients with severe allergic responses to ragweed (ragwort) should be warned about the possible cross-sensitivity to chamomile and other members of the Asteraceae/Compositae family (e.g. echinacea, feverfew, milk thistle).

ksakta Edible Parts: Edible Uses: Condiment TeaThe young sprigs are used as a seasoning[15]. The dried flowers are used to make herb teas[21, 37]. It is aromatic but with a very bitter flavour[4].

tcanta Dye Essential Hair Liquid feed Repellent StrewingAn infusion of the flowers is used as a hair shampoo, especially for fair hair[14, 20, 168]. It is also used as a liquid feed and general plant tonic, effective against a number of plant diseases[14, 18, 20]. The flowers are also an ingredient of 'Quick Return' herbal compost activator[32]. The whole plant was formerly used as a strewing herb[4, 168]. The whole plant is insect repellent[14, 20]. An essential oil from

the whole plant is used as a flavouring and in perfumery[46]. Yellow to gold dyes are obtained from the flowers[168].

dwatta Anodyne Antiinflammatory Antiseptic Antispasmodic Carminative Cholagogue Diaphoretic Homeopathy Nervine Stomachic Tonic VasodilatorGerman camomile is a well known herbal remedy and is much used in the West. In particular it is an excellent herb for treating various digestive disorders, nervous tension and irritability and is also used externally to treat skin problems[254]. An infusion of the flowers is taken internally as an anodyne, anti-inflammatory, antiseptic, antispasmodic, carminative, cholagogue, diaphoretic, emmenagogue, febrifuge, sedative, stomachic, tonic and vasodilator[7, 218, 238]. An infusion is particularly useful as a stomachic, nervine and sedative for young children, especially when they are teething[238]. It is also used in the treatment of irritable bowel syndrome, Crohn's disease, peptic ulcers and hiatus hernia[254]. In large doses, or when taken regularly for several times each day, the tea can be emetic[218] and can also cause the symptoms it is intended to cure[232]. The flowers are also used externally to treat wounds, sunburn, burns, haemorrhoids, mastitis and leg ulcers[238]. The flowers are harvested when fully open and are dried for later use[254]. The flowers contain various volatile oils including proazulenes[254]. Upon steam distillation these proazulenes produce chamazulene, this is remarkably anti-allergenic and is useful in the treatment of asthma and hay fever[254]. The flowers are sometimes added to cosmetics as an anti-allergenic agent[238]. The whole plant, harvested when in flower, is used to make a homeopathic remedy[232]. It is especially suited to teething children and those who have been in a highly emotional state over a long period of time[232]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Camomile for coughs and bronchitis, fevers and colds, inflammations of the skin, inflammation of the mouth and pharynx, tendency to infection - improve immunity, wounds and burns (see [302] for critics of commission E).

nrakta Europe, including Britain, east to W. Asia and the Himalayas. ksacta Sandy or loamy arable soils in Britain[13, 17]. Also found on saline steppes in Europe[50].

propta Seed - sow spring or autumn in situ[238]. Germination should take place within 3 weeks.

nwatta An easily grown plant, it succeeds in any well-drained soil in a sunny position[200]. It prefers neutral to slightly acid conditions and succeeds in poor soils[238]. It usually self-sows freely when well-sited[K]. Chamomile has a long history as a gentle and effective folk medicine for a wide variety of disorders, being especially effective and safe for children[K]. There is some confusion between this plant and Chamaemelum nobile as to which is the genuine camomile. This species is said to be more bitter and inferior to Chamaemelum nobile in some reports[200] and to be more active medicinally in other reports[9, 238]. Both have similar properties and can probably be used interchangeably[K]. The whole plant has a pungent aroma[245].

6.2.445 Lychnis fulgens

Brilliant campion

5 tlin 9 cyuc 1 kcaak 0 tcan 0 dwat 0.6 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliw hpa7tmwatli xre7t hjonli

drutta Lychnis fulgens is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

ksakta Edible Parts: LeavesEdible Uses: Young plant - cooked[177].

tcanta SoapAlthough no specific mention has been seen for this species, the root of several members of this genus contains saponins, a soap substitute used for washing clothes, hair etc[K]. It is extracted by boiling the roots in water[20]. Do not overboil the roots because this will break down the saponins[K].

nrakta E. Asia - Japan, Korea, Manchuria, Siberia. ksacta Meadows and shrub thickets[74]. Woodlands on low

hills, wet shady scrub meadows[266].

propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. The seed can also be sown in situ in spring or early autumn though this requires more seed. Division in spring or autumn[200]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta An easily grown plant, succeeding in a good garden soil and a warm sheltered position[1].

6.2.446 *Carex hirta*

Hammer sedge

5 tlin 9 cyuc 1 kcaak 0 tcan 1 dwat 0.5 m hkuc htut cyutli toupjh7n hwicli hrasjlutnyik hpa7tli flatprikliwss hpa7tmwatli hjonli

drutta *Carex hirta* is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to June, and the seeds ripen from June to July. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcaakta Edible Parts: Root SeedEdible Uses: Root - cooked[172]. Seed[172]. No further details are given, but the seed is small and fiddly to use[K].

tcanta BeddingThe leaves are used for bedding[61].

dwatta DiureticDiuretic[61].

nrakta Most of Europe, including Britain, south to N. Africa and east to temperate Asia. ksacta Rough grassy places, woods, damp meadows and damp sandy hollows[17].

propta Seed - sow in situ in the spring in a moist soil in light shade. If seed is in short supply it can be sown in a cold frame and be planted out in the summer. The seed usually germinates in 2 - 6 weeks at 15°C[138]. Division in spring[200]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the summer or following spring.

nwatta Easily grown in a damp to wet soil in full sun or shade[162, 200]. Members of this genus are rarely if ever troubled by browsing deer[233].

6.2.447 *Centaurea jacea*

Brown Knapweed

5 tlin 9 cyuc 1 kcaak 0 tcan 1 dwat 0.6 m hkuc htut cyutli hgatkuyctcup hwicli hyshrasjlutnyik hpa7tli flatprikliwss hpa7tmwatli fyifxre7t hjonli

drutta *Centaurea jacea* is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from August to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcaakta The young leaves are cooked as a vegetable [1b]. dwatta Bitter Diuretic Ophthalmic Stomachic TonicThe root is bitter tonic, diuretic and stomachic[7]. An excellent bitter for treating difficult digestive systems, it is still used in rural areas as a digestive and also to reduce the temperature of feverish children[7]. A distilled water made from the leaves is used as an eye lotion in the treatment of conjunctivitis[7].

nrakta Europe. Naturalized in Britain. ksacta Hedgerows, uncultivated land and waste ground[7].

propta Seed - sow April in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in the summer. Division in autumn. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the summer or following spring. This should be done at least once every three years in order to maintain the vigour of the plant. Basal cuttings in spring. Harvest the shoots when they are about 10 - 15cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Succeeds in ordinary garden soil[1, 200]. Prefers a well-drained fertile soil and a sunny position[200]. Tolerates dry, low fertility and alkaline soils[200]. Plants are suitable for the wild garden and for naturalising[200]. This species is hardy to at least -15°C[200]. Members of this genus are rarely if ever troubled by browsing deer[233].

6.2.448 *Centaurea iberica*

Iberian Star Thistle, Iberian Knapweed

5 tlin 9 cyuc 1 kcaak 0 tcan 2 dwat 0.9 m hkuc htut cyutli hgatkuyctcup hwicli hyshrasjlutnyik hpa7tli flatprikliwss hpa7tmwatli fyifxre7t hjonli

drutta *Centaurea iberica* is a BIENNIAL growing to 0.9 m (3ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcaakta Edible Parts: LeavesEdible Uses: Edible cooked[145, 177]. The part used is not specified.

dwatta Antioxidant and antimicrobial activity. Antibacterial and antifungal. Used in Turkish folk medicine to alleviate the pain and inflammatory symptoms in rheumatoid arthritis, high fever, headache, and for healing of wounds. In its native range, various uses in folk medicine are proving to have a scientific basis [1d].

nrakta S.E. Europe to S.W. Asia. ksacta Mountain slopes in Tibet at elevations of 500 - 800 metres[266].

propta Seed - sow April in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer.

nwatta Succeeds in ordinary garden soil[1, 200]. Prefers a well-drained fertile soil and a sunny position[200]. Tolerates dry, low fertility and alkaline soils[200]. This species is closely related to *C. calcitrapa*. Members of this genus are rarely if ever troubled by browsing deer[233].

6.2.449 *Ligusticum porteri*

Porter's Licorice Root

5 tlin 9 cyuc 1 kcaak 0 tcan 3 dwat 0.9 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatprikliwss hpa7tmwatli fyifxre7t hjonli

drutta *Ligusticum porteri* is a PERENNIAL growing to 0.9 m (3ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 6. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcaakta Edible Parts: Edible Uses: CondimentThe leaves are used as a flavouring, a celery substitute[155].

dwatta Antirheumatic Antispasmodic Diaphoretic Diuretic Expectorant Febrifuge Kidney Stomachic TB Uterine tonicThe roots, seed and essential oil (obtained from the roots and the seed) of this plant are a bitter, camphoraceous warming herb that stimulates the circulation, kidneys and uterus[238]. They are also antirheumatic, antispasmodic, diaphoretic, digestive, expectorant, febrifuge and

are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. If you have sufficient seed it would probably be worthwhile sowing the seed outdoors in situ in the spring. Division of rooted runners. Probably best done in spring but can be done at any time in the growing season if the plants are kept moist.

nwatta Requires a permanently moist position in sun or light shade[200]. Plants can be very invasive, though they are fairly easy to control by pulling out the rooted stems[200].

6.2.464 *Scabiosa columbaria*

Pigeon's Scabious, Dove pincushions, Pincushion Flower

5 tlin 9 cyuc 1 kcaak 0 tcan 0 dwat 0.8 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatprikliwss hpa7tmwatli xre7t hjonli

drutta *Scabiosa columbaria* is a PERENNIAL growing to 0.8 m (2ft 7in) by 0.8 m (2ft 7in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to September, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil.

kcaakta Edible Parts: LeavesEdible Uses: Leaves[177]. No more details are given.

nrakta Europe, including Britain, south and east from the Arctic circle to N. Africa, Siberia and W. Asia. ksacta Dry calcareous pastures, banks etc, to 600 metres[17].

propta Seed - sow spring in a cold frame. The seedlings are subject to damping off[1] so water with care and make sure to give adequate ventilation. Prick out the seedlings into individual pots once they are large enough to handle and plant them out into their permanent positions in the summer. Division in spring. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Landscape Uses:Border. Prefers a neutral or alkaline soil and a sunny position[200]. Succeeds in ordinary garden soil[1]. Grows well in a dry sunny meadow[200]. The flowers are a good nectar source for bees and lepidoptera, the plant is also a good food source for the caterpillars of many butterfly species[200]. This species name is sometimes treated as the group name for an aggregate of species[200]. Members of this genus are rarely if ever troubled by browsing deer[233]. Special Features: Attractive foliage, Not North American native, Naturalizing, Attracts butterflies, Suitable for cut flowers, Extended bloom season in Zones 9A and above, Attractive flowers or blooms.

6.2.465 *Achillea sibirica*

Siberian Yarrow

5 tlin 9 cyuc 1 kcaak 0 tcan 1 dwat 0.5 m hkuc htut cyutli kyuctcup hwicli hyshrasjlutnyik hpa7tli flatprikliwss hpa7tmwatli xre7t hjonli

drutta *Achillea sibirica* is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from July to September, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

kcaakta Edible Parts: LeavesEdible Uses: Young shoots and leaves - cooked[177].

dwatta Antibacterial Antiinflammatory Carminative Diaphoretic Emmenagogue Odontalgic Stomachic TonicThe whole plant is antibacterial, anti-inflammatory, antibacterial, carminative, diaphoretic, emmenagogue, odontalgic, stomachic and tonic[147, 172, 218]. A decoction is used in the

treatment of abscesses, abdominal cramps, amenorrhoea, bleeding, falls, snakebite and stomach ulcers[147, 218]. A poultice of the shaved root can be applied to gum sores[257].

nrakta E. Asia - China, Japan. North-western N. America. ksacta Meadows, gardens, sandy slopes and dry areas[172].

propta Seed - sow spring or early autumn in a cold frame[133]. The seed usually germinates in 1 - 3 months[133]. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn. Very easy, the divisions can be planted direct into their permanent positions. Basal cuttings of new shoots in spring. Very easy, collect the shoots when they are about 10cm tall, potting them up individually in pots and keeping them in a warm but lightly shaded position. They should root within 3 weeks and will be ready to plant out in the summer.

nwatta Succeeds in moist soils but prefers a well-drained soil in a sunny position[1, 200]. Plants succeed in maritime gardens[233]. They live longer when growing in a poor soil[200]. A very ornamental plant[200]. Polymorphic. Hybridizes freely with other members of this genus[200].

6.2.466 *Fraxinus chinensis rhynchophylla*

Hua Qu Liu

5 tlin 9 cyuc 0 kcaak 0 tcan 2 dwat 25 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwss hpa7tmwatli xre7t hjonli

drutta *Fraxinus chinensis rhynchophylla* is a deciduous Tree growing to 25 m (82ft 0in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

tcanta Weather protection WoodThe plant (extract?) is said to be used as a barrier to protect the skin from ultraviolet light[176]. The wood is used for cabinet making[266].

dwatta Analgesic Antinflammatory Antitussive Astringent Diuretic Dysentery Expectorant StomachicThe bark is analgesic, anti-inflammatory, antitussive, astringent, diuretic, expectorant and stomachic[176, 218, 238]. It controls bacterial infections and coughs[238]. It is used in the treatment of apoplexy, liver diseases, diarrhoea, dysentery, eye diseases such as cataracts, cough and asthma[176, 279]. The bark contains aesculin, this has anti-inflammatory, anticoagulant and analgesic actions[176]. The bark also contains fraxetin. This has an inhibitory effect on the central nervous system, is a stronger and safer anodyne than aspirin and has some antibacterial activity[176].

nrakta E. Asia - China, Japan, Korea. ksacta Woodland and thickets to 3000 metres in W. China[109]. Slopes, along rivers, roadsides, below 1500 metres[266].

propta The seed is best harvested green - as soon as it is fully developed but before it has fully dried on the tree - and can then be sown immediately in a cold frame[80]. It usually germinates in the spring[80]. Stored seed requires a period of cold stratification and is best sown as soon as possible in a cold frame[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant them out into their permanent positions or a nursery bed in late spring or early summer of the following year. If you have sufficient seed then it is possible to sow it directly into an outdoor seedbed, preferably in the autumn. Grow the seedlings on in the seedbed for 2 years before transplanting either to their permanent positions or to nursery beds.

nwatta Prefers a deep loamy soil, even if it is on the heavy side[1, 200]. Most members of this genus are gross feeders and require a rich soil[11, 200]. Plants succeed when growing in exposed positions[200] and also in alkaline soils[11]. They tolerate atmospheric pollution[200]. This sub-species grows well in Britain and is much more common in cultivation than *F. chinensis*[11, 200]. This species might

nwatta An easily grown plant, it succeeds in most soils but prefers a moist to dry acid to alkaline soil in full sun or light shade[238]. Plants are hardy to at least -15°c[238]. Hedge mustard grows well near oats but it inhibits the growth of turnips[18]. The plant has a peculiar aptitude for collecting and retaining dust[4]. This means that when growing near roads or other polluted places the leaves are seldom edible[K]. A food plant for the caterpillars of several butterfly and moth species[30].

6.2.460 Calystegia soldanella

Sea Bindweed, Seashore false bindweed
5 tlin 9 cyuc 1 kcaak 0 tcan 1 dwat 0.6 m hkuc
htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Calystegia soldanella is a PERENNIAL CLIMBER growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista This species is said to be purgative[173], some caution is advised.

kcakta Edible Parts: LeavesEdible Uses: Young shoots - cooked as a vegetable or pickled and used as a samphire substitute[2, 105]. Caution is advised since the plant might have a purgative effect[173].

tcanta StringThe stems are very flexible and are used as a string for tying[66]. Fairly strong but not long-lasting[K].

dwatta Antiscorbatic Diuretic Febrifuge Irritant Purgative VermifugeAntiscorbatic, diuretic, febrifuge, irritant, purgative and vermifuge[218].

nrakta Coastal areas of Europe, including Britain, N. Africa, Asia, N. and S. America and Australasia. ksacta Sandy and shingly sea shores and dunes[1, 17].

propta Seed - sow spring in a cold frame in a free draining compost and only just cover. The seed usually germinates in 1 - 3 months at 15°c[138]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in early spring whilst dormant[200].

nwatta Easily grown in ordinary well-drained garden soil in a sunny position[1, 200]. This species is very difficult to establish successfully in the garden[1].

6.2.461 Dodecatheon hendersonii

Sailor-Caps, Mosquito bills

5 tlin 9 cyuc 1 kcaak 0 tcan 0 dwat 0.3 m hkuc
pcimhmit cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Dodecatheon hendersonii is a PERENNIAL growing to 0.3 m (1ft) by 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf from March to July, in flower from April to June, and the seeds ripen from June to July. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: Leaves RootEdible Uses: Root - cooked[22, 46, 61, 105]. Roasted in ashes[161, 257]. It is a bulbil[60]. Leaves - cooked[46, 61, 105]. Roasted in ashes[161, 257].

nrakta South-western N. America - California to Vancouver Island. ksacta Woods and prairies[60].

propta Seed - best sown as soon as it is ripe in a cold frame[175, 200]. A short period of cold stratification may improve the germination of stored seed which should be sown in spring in a cold frame. The seed usually germinates in 1 - 12 months at 15°c[175]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on

in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in March or September. Autumn is best[1]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Prefers a moist, rich, well-drained soil and some shade[1, 175]. Prefers woodland conditions or a cool moist shady border[111, 200]. Plants prefer a dry period when dormant in the summer[188].

6.2.462 Hypericum erectum

5 tlin 9 cyuc 1 kcaak 0 tcan 1 dwat 0.6 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyfjxre7t hjonli

drutta Hypericum erectum is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves and stems[105, 177]. No more details.

dwatta Astringent GalactogogueThe leaves and flowering tops are galactogogue[218]. The stems are rich in tannin and are used in the treatment of arthritis, lumbago, neuralgia and rheumatism[218].

nrakta E. Asia - China, Japan, Korea. ksacta Grassy places and thin woods in hills and mountains all over Japan[58]. Grassy slopes at elevations of 400 - 2300 metresin China[266].

propta Seed - sow spring in a greenhouse and only just cover the seed. Germination usually takes place within 1 - 3 months at 10°c. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Easily grown in any reasonably good well-drained but moisture retentive soil[1]. Succeeds in sun or semi-shade but flowers better in a sunny position[200]. One report says that the plant is vigorous but not quite hardy in Britain[1]. This seems to be a mistake, other reports say that it is hardy to zone 6, tolerating winter temperatures down to -15°c or lower[200].

6.2.463 Hydrocotyle vulgaris

Pennywort

5 tlin 9 cyuc 1 kcaak 0 tcan 0 dwat 0.1 m hkuc
hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli frusflatprikliwis hpa7tmwatli fyfjxre7t hjonli

drutta Hydrocotyle vulgaris is a PERENNIAL growing to 0.1 m (0ft 4in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from June to August, and the seeds ripen from July to October. The species is hermaphrodite (has both male and female organs). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves - cooked. A strong carroty taste[183], they cannot be eaten in quantity[144].

nrakta Europe, including Britain, from Scandanavia south and east to N. Africa, Greece and the Caspian Sea. ksacta Bogs, fens and marshes, usually on acid soils[17].

propta Seed - we have no information on this species but suggest sowing it in early spring in a cold frame. When they

stomachic[155, 172, 238]. They are used internally in the treatment of eruptive fevers, bronchial infections, digestive complaints, toothache, painful menstruation and retained placenta[238]. They have also been used to treat TB. and headaches[155, 172]. An infusion of the roots is used externally to treat body aches[257]. The root is harvested in the autumn and can be used fresh or dried[238].

nrakta South-western N. America. ksacta Moist fertile ground, almost to the timberline, 2000 - 3500 metres in Texas[155]. Upland meadows and ravines[238].

propta The seed is best sown as soon as it is ripe in a cold frame in the autumn. Stored seed should be sown as early in the year as possible in a greenhouse or cold frame[200]. Prick out the seedlings into individual pots when they are large enough to handle and plant them out into their permanent positions in the summer if they have grown large enough. Otherwise, keep them in a cold frame for the first winter and plant them out in early summer. Division in spring.

nwatta Succeeds in any well-drained soil in a sunny position[200]. Succeeds in dry soils[238]. Plants are hardy to at least -15°c[238].

6.2.450 Hydrocotyle sibthorpioides

Water Pennywort, Lawn marshpennywort

5 tlin 9 cyuc 1 kcaak 0 tcan 2 dwat 0.1 m hkuc
hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyfjxre7t hjonli

drutta Hydrocotyle sibthorpioides is a PERENNIAL growing to 0.1 m (0ft 4in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to September, and the seeds ripen from June to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: LeavesEdible Uses: The whole plant is eaten raw or cooked as a potherb[61, 105, 183]. It has a parsley-like aroma[183].

dwatta Depurative FebrifugeDepurative, febrifuge. Resolves mucus formation[147]. The juice of the plant is used in the treatment of fevers[272]. A paste made from the plant is applied externally to wounds and boils[272]. The plant is decocted and used in the treatment of abscesses, boils, bruises, cirrhosis, colds, coughs, hepatitis, hepatoma, influenza, itch, jaundice, sinusitis and sore throat[218]. It is a Chinese herbal drug for hepatoma[218].

nrakta E. Asia - China, Japan. ksacta Shady places in lowland areas of C. and S. Japan[58]. Stream banks or forests in wet grassy places at elevations of 400 - 3000 metres in China[266].

propta Seed - we have no information on this species but suggest sowing it in early spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division of rooted runners. Probably best done in spring but can be done at any time in the growing season if the plants are kept moist.

nwatta Requires a permanently moist position in sun or light shade[200]. Plants are occasionally found as weeds in damp lawns[1].

6.2.451 Sanicula europaea

Wood Sanicle

5 tlin 9 cyuc 1 kcaak 0 tcan 2 dwat 0.6 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwisslip hpa7tmwatli fyfjxre7t hjonli

drutta Sanicula europaea is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to September, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and

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

pcista The leaves contain saponins[179]. Although toxic, saponins are very poorly absorbed by the body and so tend to pass through without causing harm, they are also destroyed by thorough cooking. Saponins are found in many plants, including several that are often used for food, such as certain beans. It is advisable not to eat large quantities of food that contain saponins. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K].

kcakta Edible Parts: LeavesEdible Uses: Leaves and young shoots - cooked. They contain saponins so should not be eaten in large quantities. A famine food, it is only used when all else fails[179].

dwatta Alterative Astringent Carminative Dysentery Expectorant VulneraryWood sanicle used to be widely used as a herbal remedy and has a long-standing reputation for healing wounds and treating internal bleeding. The herb is traditionally thought to be detoxifying and has also been taken internally to treat skin problems[254]. A potentially valuable plant, but it is little used in modern herbalism[7, 254]. The leaves and the root are alterative, astringent, carminative, expectorant and vulnerary[4, 7, 9, 13, 21, 46]. The leaves are harvested in early summer and the roots in mid to late summer, they can be dried for later use[4, 7]. The herb is highly esteemed in the treatment of blood disorders, where it is usually given in combination with other herbs[4]. It is also taken internally in the treatment of bleeding in the stomach and intestines, the coughing up of blood, nosebleeds, chest and lung complaints, dysentery, diarrhoea etc[4, 254]. It can also be used as a mouth gargle for sore throats[4]. Externally, it is applied to rashes, chilblains, inflammations etc[4, 7] and an ointment made from the plant is applied to haemorrhoids[7].

nrakta Most of Europe, including Britain, to N. Africa, the Mediterranean, E. andn W. Asia, S. Africa. ksacta Woods, thickets and damp places, avoiding acid soils[4, 21, 31]. Of-ten found in chalk beechwoods and oak woods on loamy soils[17].

propta Stratification improves the germination rate. If possible sow the seed in the autumn, sow stored seed as early in the year as possible. It is best to sow the seed in situ in a woodland soil under trees If seed is in short supply it is probably wise to sow it in pots of woodland soil in a shady place in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a shady position in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Succeeds in any moist moderately fertile well-drained soil in sun or semi-shade[4, 200]. Strongly dislikes poor thin soils[31]. Prefers a loamy or calcareous soil[9, 17]. The seeds are covered with little prickles, enabling them to become attached to anything that brushes against them and thus distributing the seed[4].

6.2.452 Lithospermum officinale

Gromwell, European stoneseed

5 tlin 9 cyuc 1 kcaak 0 tcan 2 dwat 0.8 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Lithospermum officinale is a PERENNIAL growing to 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to July, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

ksakta Edible Parts: Edible Uses: TeaThe leaves are used as a tea substitute[46, 61, 183].

tcanta DyeA purple dye is obtained from the roots. It is best harvested in the spring[178].

dwatta Contraceptive Depurative Diuretic Lithontripic Oxytotic SedativeThe mature seeds are diuretic, lithontripic and oxytotic[9, 240]. They are ground into a powder and used in the treatment of bladder stones, arthritis and febrile conditions[9]. An infusion of the leaves is used as a sedative[240]. The root is depurative[240]. A syrup made from a decoction of the root and stems is used in the treatment of eruptive diseases such as smallpox, measles and itch[240]. All parts of the plant contain a substance that inhibits the secretion of the pituitary gonadotrophic hormone[240]. Extracts of the herb possess contraceptive properties[240].

nrakta Europe, including Britain, except the extreme southwest and north, east to Iran and the Caucasus. ksacta Hedges, bushy places and woodland borders, usually on basic soil[17].

propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings. Division.

nwatta Prefers a moderately fertile well-drained soil[200].

6.2.453 Sedum divergens

Pacific Stonecrop

5 tlin 9 cyuc 1 kcaak 0 tcan 1 dwat 0.2 m hkuc htut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyfxfre7t hjonli

drutta Sedum divergens is an evergreen Perennial growing to 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista Although not poisonous, if large quantities of this plant are eaten it can cause a stomach upset[62, 85].

ksakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked[172, 177]. The leaves are very small and round, looking rather like a small green berry[256]. They have a crisp texture and were valued as a food by some North American Indian tribes who would eat them raw[256].

dwatta Antihæmorrhoidal LaxativeThe plant has been used in the treatment of piles and has been given to children as a laxative[257].

nrakta Western N. America. ksacta Rocky slopes in mountains[172]. Alpine to sub-alpine rocky ledges, ridges and talus slopes[60].

propta Seed - surface sow in spring in well-drained soil in a sunny position in a greenhouse. Do not allow the soil to dry out. Prick out the seedlings into individual pots when they are large enough to handle. If sufficient growth is made, it is possible to plant them out during the summer, otherwise keep them in a cold-frame or greenhouse for their first winter and plant them out in early summer of the following year[K]. Division is very easy and can be carried out at almost any time in the growing season, though is probably best done in spring or early summer. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Succeeds in most soils[188] but prefers a fertile well-drained soil and requires a sunny position[200]. Established plants are drought tolerant[200]. All members of this genus are said to have edible leaves, though those species, such as this one, that have yellow flowers can cause stomach upsets if they are eaten in quantity[62, 85]. Plants in this genus seem to be immune to the predations of rabbits[233].

6.2.454 Gagea lutea

Yellow Star Of Bethlehem

5 tlin 9 cyuc 1 kcaak 0 tcan 0 dwat 0.2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Gagea lutea is a BULB growing to 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from March to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

ksakta Edible Parts: Leaves RootEdible Uses: Bulb - raw or cooked[4, 105, 177]. A famine food, it is only used in times of scarcity[4]. Young leaves - cooked.

nrakta Europe, including Britain, north and Scandinavia south and east to Spain and temperate Asia to Japan. ksacta Damp woods and pastures, especially on basic soils[17].

propta Seed - sow spring in a greenhouse[200]. Sow the seed thinly so that there is no need to transplant them, and grow the seedlings on in the same pot in the greenhouse for their first year or two. Give an occasional liquid feed to ensure they do not become nutrient deficient. Pot up the small bulbs when the plants are dormant, placing 2 - 3 bulbs in each pot. Grow them on for another year or two in the greenhouse before planting them out when they are dormant. Division. We have no details of when is the best time to divide the bulbs but suggest doing it after the leaves die down in the summer.

nwatta Requires a moist soil, preferring one on the alkaline side of neutral, and succeeding in sun or shade. The dormant bulbs are fairly hardy and will withstand soil temperatures down to at least -10°c[214].

6.2.455 Acaenia anserinifolia

Pirri-Pirri Bur

5 tlin 9 cyuc 1 kcaak 0 tcan 1 dwat 0.1 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Acaenia anserinifolia is an evergreen Perennial growing to 0.1 m (0ft 4in) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf all year, in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

ksakta Edible Parts: LeavesEdible Uses: TeaThe leaves are used as a substitute for tea[2, 144, 173, 183].

tcanta A good ground-cover plant, tolerating some treading[200]. A carpeting plant, rooting as it spreads[208].

dwatta Antiplogistic Diuretic VulneryA The leaves are antiplogistic, carminative, diuretic and vulnery[61].

nrakta Eastern Australia, New Zealand. Naturalized in Britain[17]. ksacta Open positions from lowland to the montane zone in North, South and Stewart Islands of New Zealand[44].

propta Seed - sow March in a greenhouse. Germination, which can be very poor, usually takes place within 1 - 3 months at 10°c[133]. When the seedlings are large enough to handle, prick them out into individual pots, planting them out in the summer. Division in April or October. Very easy, the plants can be divided at any time of the year if required, though it will need to be done in a greenhouse during the winter months. Cuttings - August in a cold frame.

nwatta An easily grown plant, it succeeds in ordinary well-drained soil in sun or semi-shade[133, 200]. Requires a warm position[208]. Adaptable to poorly-drained soils in Australia[157]. A very invasive plant, spreading freely by its procumbent rooting stems[K]. It is low-growing, however, and so can be grown as a ground cover amongst taller plants[K].

6.2.456 Carlina vulgaris

Carline Thistle

5 tlin 9 cyuc 1 kcaak 0 tcan 1 dwat 0.5 m hkuc

htut cyutli kyuctcup hwicli hyishrasjlutnyik hpa7tli flatprikliwsslip hpa7tmwatli fyfxfre7t hjonli

drutta Carlina vulgaris is a BIENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil.

ksakta Edible Parts: FlowersEdible Uses: Flowering head - cooked. Used as a globe artichoke substitute[2, 105, 177, 183], though they are considerably smaller and even more fiddly[K].

tcanta Weather forecastingThe flower heads expand in dry weather and close in moist weather. The dried flowers will continue to do this for a long time and they thus form a basic hygrometer for use in weather forecasting[4].

dwatta Diaphoretic PurgativeThe roots and leaves are diaphoretic and purgative[4].

nrakta Europe, including Britain, north to 60° N., east to Siberia, Caucasus and W. Asia. ksacta Poor soils[200] on dry banks and pastures[4], especially on chalk[13, 17].

propta Seed - surface sow in a cold frame in the spring. The seed usually germinates in 4 - 8 weeks at 15°c[138]. As soon as they are large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in the summer.

nwatta Succeeds in a sunny position in ordinary garden soil[1]. Prefers an alkaline soil[138]. Prefers a poor soil[4, 200]. Plants are hardy to about -15°c[200]. The presence of this species in a meadow usually indicates a poor sandy soil[4]. This species resents root disturbance, it should be planted into its final position as soon as possible[138].

6.2.457 Senecio vulgaris

Groundsel

5 tlin 9 cyuc 1 kcaak 3 tcan 2 dwat 0.3 m hkuc htut cyutli kyuctcup hwicli hyishrasjlutnyikfrip hpa7tli flatprikliwis hpa7tmwatli fyfxfre7t hjonli

drutta Senecio vulgaris is a ANNUAL growing to 0.3 m (1ft) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower all year, and the seeds ripen all year. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

pcista All parts of the plant are poisonous to many mammals, including humans. The toxin affects the liver and has a cumulative affect[9, 65]. Some mammals, such as rabbits, do not seem to be harmed by the plant, and will often seek it out[4]. Various birds also eat the leaves and seeds[4].

ksakta Edible Parts: LeavesEdible Uses: Leaves - cooked or raw[7, 105]. The young leaves have been used in many areas as a salad, though this is very inadvisable, see the notes on toxicity at the top of the page[7].

tcanta A good food plant for the caterpillars of many butterfly and moth species, and is one of only two species that provide food for cinnabar moth caterpillars. Dynamic accumulator.

dwatta Anthelmintic Anticonvulsant Antiscorbutic Diaphoretic Diuretic Emmenagogue Homeopathy Poultice PurgativeGroundsel has a long history of herbal use and, although not an official plant, it is still often used by herbalists[4]. The whole herb is anthelmintic, antiscorbutic, diaphoretic, diuretic, emmenagogue and purgative[4, 9, 21, 54]. It is often used as a poultice and is said to be useful in treating sickness of the stomach, whilst a weak infusion is used as a simple and easy purgative[4]. The plant can be harvested in May and dried for later use, or the fresh juice can be extracted and used as required[4]. Use with caution[21]. This plant should not be used by pregnant women[7], see also

the notes above on toxicity. A homeopathic remedy is made from the plant[9]. It is used in the treatment of menstrual disorders and nose bleeds[9].

nrakta Europe, including Britain, south and east from Scandinavia to N. Africa and temperate Asia. ksacta Found along roadsides and waste places, it is also a common weed of cultivated land, succeeding on most soils but avoiding shade[7, 9, 17].

propta Seed - it doesn't need any encouragement from us.

nwatta A common weed of cultivated land, it does not require cultivation. Groundsel is a good food plant for the caterpillars of many butterfly and moth species, and is one of only two species that provide food for cinnabar moth caterpillars. One report states that this plant was formerly cultivated as a food crop for livestock[54]! Since the plant is a cumulative toxin this use is most questionable.

6.2.458 Urospermum dalechampii

5 tlin 9 cyuc 1 kcaak 0 tcan 0 dwat 0.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Urospermum dalechampii is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 6. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

ksakta Edible Parts: LeavesEdible Uses: Leaves - raw. They can be used in salads but are very bitter[217].

nrakta S. Europe - Mediterranean. ksacta Cultivated ground.

propta Seed - we have no information for this species but suggest sowing the seed in situ either as soon as it is ripe in late summer or in the spring. Division.

nwatta Succeeds in any fertile soil in a very sunny position[233]. A very ornamental plant[233].

6.2.459 Sisymbrium officinale

Hedge Mustard

5 tlin 9 cyuc 1 kcaak 0 tcan 2 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyfxfre7t hjonli

drutta Sisymbrium officinale is a ANNUAL growing to 0.6 m (2ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from June to July, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

ksakta Edible Parts: Leaves SeedEdible Uses: CondimentYoung shoots - raw or cooked[2, 9, 85]. A bitter cabbage-like flavour, they are used as a flavouring in salads or cooked as a potherb[183, K]. Seed - raw or cooked[257]. It can be ground into a powder and used as a grael or as a mustard-like flavouring in soups etc[85, 183].

tcanta Soil conditionerAlkaline secretions from the growing roots help to sweeten an acid soil[18].

dwatta Antiaphonic Diuretic Expectorant Laxative StomachicThe whole plant is said to be antiaphonic, diuretic, expectorant, laxative and stomachic[4, 7, 21, 46]. This plant was at one time known as the 'singer's plant' because of its use in treating loss of the voice[7]. A strong infusion of the whole plant has been used in the treatment of throat complaints[4, 238]. Excessive doses can affect the heart[238]. The dried plant is almost inactive, so it should only be used when freshly harvested[7].

nrakta Europe, including Britain, south and east from Scandinavia to N. Africa and the Near East. ksacta Hedge banks, uncultivated ground, waste ground, the sites of ruined buildings etc. It is a fairly common weed of cultivated land[7, 17].

propta Seed - sow spring or autumn in situ[238].

6.2.505 *Knautia arvensis*

Field Scabious, Field scabiosa
5 tlin 9 cyuc 0 kcaak 0 tcan 2 dwat 1 m hkuc
hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flat-
prikkwisslip hpa7tmwatli xre7t hjonli

drutta *Knautia arvensis* is a PERENNIAL growing to 1 m (3ft 3in) by 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

dwatta Antipruritic Astringent Diuretic Eczema HomeopathyThe whole plant is astringent and mildly diuretic[9]. An infusion is used internally as a blood purifier and externally for treating cuts, burns and bruises[9]. The fresh or dried flowering plant can be used, with or without the roots[9]. A homeopathic remedy is made from the plant[9]. It is used as a blood purifier and as a treatment for eczema and other skin disorders[9].

nrakta Europe, including Britain, north to latitude 69°, east to the Caucasus and W. Siberia. ksacta Meadows, pastures, hedgebanks and grassy hills, usually on dry soils and especially on limestone[9, 17, 187].

propta Seed - sow spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. If you have enough seed it would be worthwhile trying a sowing in situ outdoors in the spring. The seed germinates in the spring in the wild. Division in the spring. Basal cuttings in late spring. Harvest the shoots when they are about 10 - 15cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Succeeds in any well-drained soil[187]. Prefers a dry soil[9, 17]. Grows well on chalky soils[4]. Prefers a sunny position[188]. A very cold-hardy plant, tolerating temperatures down to at least -25°C[187]. Grows well in the summer meadow[24, 187]. The plant is an important source of nectar and pollen for bees and lepidoptera[24, 108]. The plants are sometimes dioecious, if this is the case then male and female plants will need to be grown if seed is required.

6.2.506 *Verbascum phlomoides*

Woolly Mullein, Orange mullein
5 tlin 9 cyuc 0 kcaak 2 tcan 3 dwat 1.2 m hkuc
htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatprikli-
wisslip hpa7tmwatli fyifxre7t hjonli

drutta *Verbascum phlomoides* is a BIENNIAL/PERENNIAL growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil.

tcanta RepellentThe whole plant is used to repel mice and rats[46, 61]. Dynamic accumulator.

dwatta Anodyne Antiseptic Demulcent Diuretic Expecto- rant Pectoral VermifugeThe seed is used to expel tape- worms from the body[4]. No other details are given, but the seeds probably contain saponins and so should be used with caution[K]. The flowers and leaves are anodyne, anti- septic, astringent, demulcent, emollient, expectorant, pec- toral and vulnerary[21, 238]. An infusion is used internally in the treatment of various respiratory complaints including coughs, bronchitis, asthma and throat irritations[238]. An infusion of the fresh or dried flowers in olive oil is used to treat earaches, sores, wounds, boils etc[238]. The plant is harvested when in flower and should be dried quickly and with care or it will lose its medicinal qualities[238].

nrakta S. Europe. Rarely naturalized in Britain[17]. ks- acta Dry sandy or stony ground[17].

propta Seed - sow late spring to early summer in a cold frame and only just cover the seed[200]. Germination usually takes place within 2 - 3 weeks. When they are large enough to handle, prick out the seedlings into individual pots and plant them out in late summer. The seed has a long viability[200].

nwatta An easily grown plant, it succeeds in most well- drained soils, including dry ones, and prefers a sunny position[200]. Dislikes shade and wet soils[200]. Thrives on chalk[200]. Prefers a light soil[200]. This species is hardy to at least -15°C[200]. Hybridizes with other members of this genus, though the progeny are usually sterile[200]. Plants can perennate when growing in light well-drained soils[111].

6.2.507 *Primula macrophylla*

5 tlin 9 cyuc 0 kcaak 0 tcan 2 dwat m hkuc
htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliw-
is hpa7tmwatli xre7t hjonli

drutta *Primula macrophylla* is a PERENNIAL growing to 0.3 m (1ft) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

dwatta Antinflammatory FebrifugeThe entire plant is used in Tibetan medicine, it is said to have a bitter taste and a cooling potency[241]. Antidiarrhetic, anti-inflammatory and febrifuge, it is used in the treatment of diarrhoea, inflamma- tion of the liver, gall bladder, stomach and intestines[241]. It is especially used for children with high fever and diar- rhoea[241].

nrakta E. Asia - Himalayas from Afghanistan to China. ksacta Grassy mountain slopes, rock crevices, wet meadows and marshes at elevations of 4000 - 5200 metres[266].

propta Seed - best sown as soon as it is ripe in a cold frame[133]. Sow stored seed in early spring in a cold frame[1]. Germination is inhibited by temperatures above 20°C[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in autumn. This is best done every other year[200].

nwatta A plant of high alpine areas, it is of difficult cul- tivation in Britain[200]. In the wild it experiences wet sum- mers, relatively dry autumns and long winters under a blan- ket of snow that protects the bulb-like resting bud[200]. It is best to give the plants a deep, well-drained soil in a sunny position with the added protection of a pane of glass[200].

6.2.508 *Geranium pratense*

Meadow Crane's Bill, Meadow geranium, Geranium
5 tlin 9 cyuc 0 kcaak 0 tcan 2 dwat 1.2 m hkuc
htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliw-
is hpa7tmwatli xre7t hjonli

drutta *Geranium pratense* is a PERENNIAL growing to 1.2 m (4ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

dwatta Analgesic Antiinflammatory Febrifuge Vulner- aryThe plant is used as a vulnerary[240]. The root is used in Tibetan medicine where it is said to have an acrid, sweet flavour plus a cooling potency[241]. Analgesic, anti- inflammatory and febrifuge, it is used in the treatment of fevers from influenza, inflammation of the lungs, pain and swellings of the limbs[241].

nrakta Europe, including Britain, from Scandanavia south and east to Spain, the Himalayas and N. Asia. ksacta Meadows and roadsides[17].

propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Landscape Uses:Alpine garden, Border. Succeeds in any moderately fertile retentive soil in a sunny position[200]. Tolerates a wide range of soil types[200]. There are many named varieties, selected for their ornamental value[200]. Plants can be naturalized in meadows[200]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Special Features: Attractive foliage, Not North American native, Naturalizing, Suitable for cut flowers.

6.2.509 Veratrum nigrum

Black Hellebore

5 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 1.5 m hkuc hmimhtut cyutli tcup hwicli hrasljutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

dрутта Veratrum nigrum is a PERENNIAL growing to 1.5 m (5ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All parts of the plant are highly poisonous[178, 200].

tcanta InsecticideThe dried and powdered root is used as an insecticide and a parasiticide[172]. It is also effective against caterpillars and mammals so great caution is advised[1, 19, 20].

dwatta Analgesic Anthelmintic Emetic Errhine Expectorant Laxative VermifugeThe root is anthelmintic, emetic, errhine, expectorant, laxative and vermifuge[178, 218]. This herb is highly toxic and should not be used internally, or even externally, without expert guidance[K]. The whole plant is analgesic[218].

nrakta S. Europe to E. Asia. ksacta Dry glades and water meadows, mountain slopes, scrub and rarely in broad-leaved woods in Siberia[74].

propta Unless stored in damp sand at around 4°c the seed has a short viability[200]. Where possible it is best to sow the seed in a lightly shaded position in the greenhouse as soon as it is ripe[200]. Stored seed needs to be stratified but can be very slow to germinate. Germination can be erratic even for seed sown when it was fresh, it usually takes place within 3 - 12 months at 15°c but can be much longer[200]. The plant produces just one seedleaf in its first year, this forms an over-wintering bulb. It takes up to 10 years for the plant to reach maturity[200]. Sow the seed thinly so there is no need to thin or transplant them, and grow the seedlings on undisturbed in the pot for their first two years of growth. Apply a liquid feed at intervals through the growing season to ensure the plants do not become nutrient deficient. At the end of the second year plant out the dormant plants into individual pots and grow them on in light shade in the greenhouse for a further year or two before planting them out into their permanent positions in late spring or early summer. Division in March/April or in October. Establish the plants in pots in a shaded frame before planting them out[200]. Division is best carried out in the autumn because the plants come into growth very early in the spring[233]. Root cuttings, 6mm long with a bud, rooted in a sandy soil in a cold frame[200].

nwatta Requires a deep fertile moisture retentive humus-rich soil[200]. Succeeds in full sun if the soil does not dry out but prefers a position in semi-shade[200]. Dislikes dry soils[42]. Grows best in a cool woodland garden or a north facing border[42]. Plants are hardy to about -25°c[187], especially if they are given a protective mulch in the winter. The flowers smell of rotten fruit and are visited by flies[187]. Members of this genus are rarely if ever troubled by browsing deer[233]. Plants are long-lived and can be left in the same position for years without attention[233].

6.2.510 Hebe rakaiensis

5 tlin 9 cyuc 0 kcak 3 tcan 0 dwat 1 m hkuc htut cyutli tcup hwicli hrasljutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

dрутта Hebe rakaiensis is an evergreen Shrub growing to 1 m (3ft 3in) by 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerate maritime exposure. It can tolerate atmospheric pollution.

tcanta Hedge HedgeAn excellent ground cover plant[182], though it takes about 2 years to form an effective cover[197]. Plants should be spaced about 60cm apart each way[208]. It can also be grown as a dwarf hedge, tolerating gentle clipping[182]. Attractive flowers.

nrakta New Zealand. ksacta Rocky places at low altitudes in South Island[184].

propta Seed - we have no information on this species but suggest sowing the seed in a greenhouse in spring. Only just cover the seed and do not allow the compost to dry out. Prick out the seedlings into individual pots when they are large enough to handle. Grow on the young plants for at least their first winter in a greenhouse and plant out in late spring or early summer after the last expected frosts. It would probably be worthwhile giving some protection to the plant for its first winter outdoors. Cuttings of half ripe wood, 3 - 5cm with a heel, July/August in a frame. Pot up when roots are forming and keep in a frame or greenhouse for its first winter before planting out in late spring. Cuttings of mature wood, late autumn or winter in a frame.

nwatta Prefers a position in full sun, succeeding in most well-drained soils with some shelter from cold winds[200]. Dislikes very dry soils and water-logged soils. Tolerant of atmospheric pollution and maritime exposure[200]. Plants are hardy to about -15°c[184]. Hybridizes freely with other members of this genus[200]. Plants of this species are often grown under the names of H. buxifolia or H. subalpina in British gardens[200]. This species is very easy to transplant and, with care, it can even be moved when in flower[200]. Plants in this genus are notably resistant to honey fungus[200]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is clumping, giving the plant a clumping habit. The predictable growth behaviour makes it easier to maintain without having to apply containment methods[2-1].

6.2.511 Arnica montana

Arnica, Mountain arnica

5 tlin 9 cyuc 0 kcak 0 tcan 3 dwat m hkuc hmimhtut cyutli tcup hwicli hyishrasljutnyik hpa7tli frusflatpriklwis hpa7tmwatli fyixre7t hjonli

dрутта Arnica montana is a PERENNIAL growing to 0.3 m (1ft) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Deadly in large quantities. The whole plant is toxic and should only be used for external applications to unbroken skin[9, 14, 65, 172]. Alcoholic extracts of arnica can cause toxic effects on the heart and raise blood pressure [301].

dwatta Antieccychmotic Antiphlogistic Antirheumatic Epilepsy Nervine Sternutatory VulneraryArnica has a long history of herbal use, especially as an external treatment for bruises and sprains[232, 238] - it is an ingredient of a number of proprietary preparations[238]. Internally, it has been used in the treatment of heart complaints and as a booster for

the immune system[238]. Arnica increases local blood supply and accelerates healing, it is anti-inflammatory and increases the rate of absorption of internal bleeding[254]. Generally the plant is nowadays only recommended for internal use as a homeopathic medicine, principally for treating shock, injury and pain[254]. If used as a decoction or tincture it stimulates the circulation and is valuable in the treatment of angina and a weak or failing heart, but it can be toxic even at quite low doses and so is rarely used this way[254]. The flowers are the part most commonly used[4, 232], they are harvested when fully open and dried - the receptacles are sometimes removed since these are liable to be attacked by insects[4]. The root is also used, it is harvested after the leaves have died down in the autumn and dried for later use[4]. The whole plant is antieczymotic, antiphlogistic, nervine, sternutatory, vulnerary[4, 7, 9, 46, 165]. Although a very valuable remedy, it should be used with caution. It has been known to cause contact dermatitis when used externally and collapse when taken internally[238]. Only take it internally under the supervision of a qualified practitioner. The freshly crushed flowers cause sneezing if inhaled[232]. The leaves have also been smoked as a tobacco[232], though it is unclear whether this was for medicinal reasons. The whole plant, harvested when in flower, is used in homeopathic remedies[232]. It is especially useful in the treatment of traumatic injuries, sores and bruises[232]. The homeopathic dose has also been used effectively in the treatment of epilepsy and seasickness, and it might be of use as a hair growth stimulant[268]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Arnica montana for fever and colds, inflammation of the skin, cough/bronchitis, inflammation of the mouth and pharynx, rheumatism, common cold, blunt injuries, tendency to infection (see [302] for critics of commission E). The essential oil has to be diluted before being used externally [301].

nrakta C. Europe. ksacta Calcareous soils in mountain pastures[7]. Found especially on granite or siliceous soils in the Alps, up to 2500 metres. Pasture and open woodland, usually on poorer acid soils[200].

propta Seed - best sown as soon as it is ripe in pots outdoors. Sow stored seed in early spring in a cold frame[4]. A period of cold stratification is helpful[238]. The fresh seed can germinate in 3 - 4 weeks at 13°C according to one report[134], though it can be slow, difficult and erratic and take 2 years to germinate[268]. Prick out the seedlings into individual pots when they are large enough to handle and plant them out into their permanent positions in the following spring. Division in spring.

nwatta Prefers a moist, well-drained humus rich soil, preferably lime-free[200]. One report says that it is often found in calcareous soils in the wild[7]. Tolerates a pH in the range 5.8 to 7.6. Prefers a mixture of sand, loam and peat[1]. Prefers a position in full sun[1, 134]. Succeeds in light woodland[14] and in a rock garden or border[1, 14]. Plants are hardy to about -25°C[187]. This species is declining in the wild, probably because of over-collection as a medicinal herb. It may become extinct in part of its range[200].

6.2.512 Carex morrowii

Iwashiba, Japanese Sedge

5 tlin 9 cyuc 0 kcaak 4 tcan 0 dwat m hkuc
pcimhmimhtut cyutli tcup hwicli hrasjltunyk hpa7tli flat-
priklwis hpa7tmwatli hjonli

drudda Carex morrowii is an evergreen Perennial growing to 0.6 m (2ft) by 0.6 m (2ft) in at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

tcanta Carbon Farming Solutions - Industrial Crop: biomass (Crops grown for non-food uses. Industrial crops provide resources in three main categories: materials, chemicals, and energy. Traditional materials include lumber and thatch, paper and cardboard, and textiles) [1-1]. Carex species are popular in horticulture especially for shady positions. No information was found for Carex morrowii but some Carex native species are used in wildland habitat restoration projects, natural landscaping, and in sustainable landscaping

as drought-tolerant grass replacements for lawns and garden meadows. Grows well in the shade of trees. Carex morrowii is typically grown for its attractive shape and foliage. Effective accent for smaller gardens. Can be grown in pots.

nrakta E. Asia. ksacta Native to low alpine areas in Japan. Most sedges are found in wetlands - such as marshes, calcareous fens, bogs and other peatlands, pond and stream banks, and riparian zones.

propta Propagation is by seed or division in spring.

nwatta Industrial Crop: Biomass Management:

Hay Regional CropClimate: boreal to warm temperate. Humidity: aquatic. Best grown in moist, fertile, medium to wet soils in part shade to full shade. Soils should not be allowed to dry out. In full sun and hot sites foliage tends to bleach to an unattractive yellow. Tolerates: Deer, Heavy Shade, Erosion, Wet Soil. Carbon Farming Solutions - Cultivation: regional crop. Management: hay (Describes the non-destructive management systems that are used in cultivation) [1-1].

6.2.513 Achillea erba

Musk Milfoil

5 tlin 9 cyuc 0 kcaak 0 tcan 2 dwat m hkuc
htut cyutli kyuctcup hwicli hyishrasjltunyk hpa7tli flatprikl-
wis hpa7tmwatli xre7t hjonli

drudda Achillea erba-rotta moschata is a PERENNIAL growing to 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in June, and the seeds ripen in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

dwatta Appetizer Diaphoretic Digestive Diuretic Stomachic TonicThe leaves and flowering stems are appetizer, diaphoretic, digestive, diuretic, stomachic and tonic[9, 46, 61]. An infusion is used in the treatment of liver and kidney disorders, as a tonic to the digestive system, exhaustion, nervous headaches etc[9]. The plant is harvested in the summer and can be dried for later use[9].

nrakta Europe ksacta Rocky slopes, alpine grassland and scree on calcareous soils in the Alps[9, 50].

propta Seed - sow spring or early autumn in a cold frame[133]. The seed usually germinates in 1 - 3 months[133]. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn. Very easy, the divisions can be planted direct into their permanent positions. Basal cuttings of new shoots in spring. Very easy, collect the shoots when they are about 10cm tall, potting them up individually in pots and keeping them in a warm but lightly shaded position. They should root within 3 weeks and will be ready to plant out in the summer.

nwatta Succeeds in most soils but prefers a well-drained soil in a sunny position[1]. Lives longer in a poor soil[200]. Hybridizes freely with other members of this genus[200]. Plants succeed in maritime gardens[233].

6.2.514 Reseda luteola

Weld, Dyer's Rocket

5 tlin 9 cyuc 0 kcaak 3 tcan 1 dwat 1.5 m hkuc
htut cyutli tcup hwicli hrasjltunyk hpa7tli flatpriklwisslip
hpa7tmwatli fyifxre7t hjonli

drudda Reseda luteola is a BIENNIAL growing to 1.5 m (5ft) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from June to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers moist soil.

tcanta Dye OilA deep yellow dye is obtained from the plant, it is of very good quality[17, 46, 74]. The plant is harvested as the last flowers fade[115]. Most of the dye is found in the seed[115]. An oil is obtained from the seed, used in lighting[100].

dwatta NarcoticNarcotic (mild).

nrakta Europe, including Britain, from Sweden south and east to N. Africa and W. Asia. ksacta Disturbed ground, arable land, walls etc, especially on calcareous soils[17].

propta Seed - sow in situ in the spring and only just cover the seed. An autumn sowing usually succeeds in areas where winter temperatures do not fall below about -10°C[200]. The seed germinates in the autumn in the wild.

nwatta Easily grown in any well-drained neutral to slightly alkaline soil in a sunny position or in some shade if the summers are long and hot[200]. At one time this plant was commonly cultivated for the dye obtained from the leaves and seed but with the advent of chemical dyes it has fallen into disuse[1, 17, 46]. A good plant for bees and butterflies[200]. Plants dislike root disturbance, they can be transplanted but care must be taken not to break the tap root[169].

6.2.515 Hebe 'Great Orme'

Great Orme Hebe

5 tlin 9 cyuc 0 kcak 3 tcan 0 dwat 1.5 m hkuc
htut cyutli hgattcup hwicli hrasjlutnyik hpa7tli flatprikliwis
hpa7tmwatli xre7t hjonli

drutta Hebe 'Great Orme' is an evergreen Shrub growing to 1.5 m (5ft) by 1.2 m (4ft in). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from August to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil and can tolerate drought. The plant can tolerate maritime exposure. It can tolerate atmospheric pollution.

tcanta Hedge HedgeCan be used as a hedge in maritime areas, it is very resistant to salt winds[200]. Attractive flowers.

nrakta A garden hybrid of uncertain origin[200]. ksacta Not known in the wild.

propta Seed - we have no information on this species but suggest sowing the seed in a greenhouse in spring. Only just cover the seed and do not allow the compost to dry out. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. This species is a hybrid and will not breed true from seed. Cuttings of half ripe wood, 3 - 5cm with a heel, July/August in a frame. Cuttings of mature wood, late autumn or winter in a frame.

nwatta Prefers a position in full sun, succeeding in most well-drained soils with some shelter from cold winds[200]. Dislikes very dry soils and water-logged soils, but is somewhat drought tolerant when established[190]. Tolerant of atmospheric pollution and maritime exposure[200]. Plants are hardy to about -10°C. They grow well in a dry border in an Essex garden[190]. Hybridizes freely with other members of this genus[200]. Tolerant of pruning, plants can be cut back into old wood if required[188]. Closely related to H. 'Carnea'[200]. This species is very easy to transplant and, with care, it can even be moved when in flower. Plants in this genus are notably resistant to honey fungus[200]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is clumping, giving the plant a 'clumping' habit. The predictable growth behaviour makes it easier to maintain without having to apply containment methods[2-1].

6.2.516 Aconitum chinense

5 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 1.2 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyikfrp hpa7tli flatprikliwis
hpa7tmwatli xre7t hjonli

drutta Aconitum chinense is a PERENNIAL growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The whole plant is highly toxic - simple skin contact has caused numbness in some people[1, 200].

dwatta Analgesic Anodyne Carminative Diaphoretic Diuretic Irritant SedativeThe root is analgesic, anodyne, carminative, diaphoretic, diuretic, irritant, sedative[4, 7, 9, 145, 165]. This is a very poisonous plant and should only be used with extreme caution and under the supervision of a qualified practitioner.

nrakta E. Asia - China ksacta Not known

propta Seed - best sown as soon as it is ripe in a cold frame[111]. The seed can be stratified and sown in spring but will then be slow to germinate[133]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer. Division - best done in spring but it can also be done in autumn[1, 111]. Another report says that division is best carried out in the autumn or late winter because the plants come into growth very early in the year[233].

nwatta Thrives in most soils and in the light shade of trees[1]. Grows well in heavy clay soils. Prefers a moist soil in sun or semi-shade[200]. Prefers a calcareous soil. Grows well in open woodlands[1, 4]. Members of this genus seem to be immune to the predations of rabbits and deer[233]. A greedy plant, inhibiting the growth of nearby species, especially legumes[54].

6.2.517 Ligusticum sinense

Chuang Xiong

5 tlin 9 cyuc 0 kcak 0 tcan 3 dwat 1 m hkuc
htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis
hpa7tmwatli fyifxre7t hjonli

drutta Ligusticum sinense is a PERENNIAL growing to 1 m (3ft 3in) by 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

dwatta Analgesic Antifungal Antirheumatic Antispasmodic Diaphoretic Emmenagogue SedativeThe root is anodyne, antibacterial, antifungal, antirheumatic, antispasmodic, emmenagogue, diaphoretic, hypotensive and sedative[176, 218, 238]. It is taken internally in the treatment of menstrual disorders, post-partum bleeding, coronary heart disease, poor circulation, headaches etc[238]. It is soaked in alcohol for 2 weeks and then used in the treatment of gout[218]. The root is harvested in the autumn and dried for later use[238].

nrakta E. Asia - China, Japan. ksacta Forests, grassy slopes or stream sides at elevations of 500 - 2700 metres[266].

propta The seed is best sown as soon as it is ripe in a cold frame in the autumn. Stored seed should be sown as early in the year as possible in a greenhouse or cold frame. Prick out the seedlings into individual pots when they are large enough to handle and plant them out into their permanent positions in the summer if they have grown large enough. Otherwise, keep them in a cold frame for the first winter and plant them out in early summer. Division in spring.

nwatta Succeeds in any well-drained soil in a sunny position[1, 200]. Tolerates moister conditions than many other members of the genus[238]. Plants are hardy to at least -15°C[238].

6.2.518 *Inula conyza*

Ploughman's Spikenard

5 tlin 9 cyuc 0 kcaak 0 tcan 1 dwat 1.2 m hkuc
htut cyutli tcup hwicli hrasjltunyk hpa7tli flatprikhwisslip
hpa7tmwatli fyixre7t hjonli

drutta *Inula conyza* is a BIENNIAL/PERENNIAL growing to 1.2 m (4ft) by 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers moist soil.

tcanta Incense Insecticide ParasiticideThe leaves are burnt and used as an insecticide and parasiticide, especially against fleas[4, 100]. Even the smell of the plant is said to drive fleas away[4]. The root used to be burnt upon a fire in order to scent a room[245].

dwatta Antiscrophulatic Emmenagogue Parasiticide VulneraryThe herb is antiscrophulatic, emmenagogue and vulnerary[4]. The plant was considered to be a good wound herb and it was frequently taken in decoction for bruises, ruptures, internal wounds etc[4]. It was applied externally to treat itchy skin[4].

nrakta Central and southeastern Europe, including Britain, from Denmark to N. Africa and the Near East. ksacta Dry or rocky slopes and cliffs, also in open scrub on calcareous soils[17].

propta Seed - sow spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. If you have sufficient seed, it is worthwhile trying a sowing in situ in the spring or the autumn.

nwatta Succeeds in an ordinary garden soil in a sunny position[1]. The basal leaves of this species are often mistaken for the foxglove, *Digitalis purpurea*[17]. The basal leaves form a rosette that covers the ground for 30cm or more, destroying the grass underneath[245]. All parts of the plant are refreshingly aromatic[245].

6.2.519 *Lobelia siphilitica*

Great Blue Lobelia, Blue Cardinal Flower, Big Blue Lobelia, Great Lobelia

5 tlin 9 cyuc 0 kcaak 0 tcan 2 dwat 1 m hkuc
hmimhtut cyutli tcuphja7n hwicli hrasjltunyk hpa7tli flatprikhwis hpa7tmwatli xre7t hjonli

drutta *Lobelia siphilitica* is a PERENNIAL growing to 1 m (3ft 3in) by 0.3 m (1ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from August to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

pcista The plant is potentially poisonous[222]. It contains the alkaloid lobeline which has a similar effect upon the nervous system as nicotine[274].

dwatta Analgesic Cathartic Diaphoretic Dysentery Emetic Homeopathy Poulitice VDThe root is cathartic, diaphoretic and emetic[4, 46, 103]. It is used in the treatment of drowsy, diarrhoea, stomach complaints, syphilis and dysentery[4, 257]. A poultice of the root has been applied to sores that are hard to heal[257]. The leaves are analgesic and febrifuge[257]. An infusion has been used in the treatment of colds and fevers[257]. A poultice of the crushed leaves has been applied to the head to relieve the pain of headaches[257]. At one time in N. America the root of this plant was believed to be effective in the treatment of VD[103, 222]. When used in Europe, however, it was found to be ineffective[213]. This might have been because the N. American Indians used the fresh root (which still contained the volatile oils) and also used it in conjunction with *Podophyllum peltatum* and *Prunus virginiana*, and then dusted the ulcers with the bark of *Ceanothus americanus*[213]. It was believed by some native North American Indian tribes that if the finely

ground roots were secretly added to the food of an arguing couple then this would avert a divorce and they would love each other again[213]. A homeopathic remedy is made from the roots[4].

nrakta Eastern N. America - Maine to S. Dakota, south to Texas and Missouri. ksacta Moist woods and marshes[187].

propta Seed - best sown as soon as it is ripe in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring[200]. Basal cuttings in spring[1]. Harvest the shoots when they are about 10cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer. Layering in moist sand, it forms roots at the nodes[200].

nwatta Landscape Uses:Border, Massing, Woodland garden. Requires a moist soil, succeeding in full sun or partial shade[111, 187, 200]. A very ornamental plant[1], but it is short-lived unless divided frequently[233]. Special Features:Attracts birds, North American native, Naturalizing, All or parts of this plant are poisonous, Wetlands plant, Attracts butterflies, Suitable for cut flowers.

6.2.520 *Hypericum bellum*

5 tlin 9 cyuc 0 kcaak 0 tcan 1 dwat 1 m hkuc
hmimhtut cyutli tcup hwicli hrasjltunyk hpa7tli flatprikhwisslip hpa7tmwatli fyixre7t hjonli

drutta *Hypericum bellum* is an evergreen Shrub growing to 1 m (3ft 3in) by 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from July to August, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

tcanta MiscellanyA good ground cover[11].

dwatta Dysentery Febrifuge Miscellany Vermifuge-Febrifuge, vermifuge. Also used in the treatment of hepatitis, colds, dysentery and dermatitis[91].

nrakta E. Asia - China to the Himalayas. ksacta Scrub on open hillsides[184]. Forest glades[91]. Open forest, forest edges, thickets and grassy slopes at elevations of 1900 - 3200 metres in the western Himalayas[266].

propta Seed - sow spring in a greenhouse and only just cover the seed. Germination usually takes place within 1 - 3 months at 10°C. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood 10 - 12 cm with a heel, July/August in a frame. Plant out in the following spring[200] Careful division of old suckering shrubs in the dormant season.

nwatta Easily grown in any reasonably good well-drained but moisture retentive soil[11]. Succeeds in sun or semi-shade but flowers better in a sunny position[200]. Tolerates chalk. A very ornamental plant[11], it is hardy to about -10°C[184]. Plants in this genus are notably resistant to honey fungus[200].

6.2.521 *Primula reticulata*

5 tlin 9 cyuc 0 kcaak 0 tcan 1 dwat 0.4 m hkuc
hmimhtut cyutli tcup hwicli hrasjltunykfrrip hpa7tli flatprikhwis hpa7tmwatli xre7t hjonli

drutta *Primula reticulata* is a PERENNIAL growing to 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay

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

pcista There is one report that the leaves are toxic to cattle[240].

dwatta AnodyneThe herb is used externally as an anodyne[240].

nrakta E. Asia - Himalayas from C. Nepal to S.E. Tibet. ksacta Shrubberies and open slopes, 3300 - 4800 metres[51]. Thickets on mountain slopes around 3000 metres[266].

propta Seed - best sown as soon as it is ripe in a cold frame[133]. Sow stored seed in early spring in a cold frame[1]. Germination is inhibited by temperatures above 20°C[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in autumn. This is best done every other year[200].

nwatta Prefers a deep moist humus-rich soil, succeeding in full sun if the soil is reliably moist throughout the growing season, otherwise it requires some shade[1, 200]. Grows well in heavy clay soils. Succeeds along the sides of streams and in woodland gardens[200]. Plants self-sow when in suitable conditions[200].

6.2.522 Dianthus chinensis

Chinese Pink, Rainbow pink, Annual Pink, China Pink

5 tlin 8 cyuc 0 kcak 0 tcan 3 dwat 0.7 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta *Dianthus chinensis* is a PERENNIAL growing to 0.7 m (2ft 4in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

dwatta Anthelmintic Antibacterial Antiphlogistic Diaphoretic Diuretic Emmenagogue Febrifuge Haemostatic Ophthalmic Tonic UrinaryThe Chinese pink has been used for over 2,000 years in Chinese herbal medicine[238]. The whole plant is a bitter tonic herb that stimulates the digestive and urinary systems and also the bowels[238]. It is also anthelmintic, antibacterial, antiphlogistic, diaphoretic, diuretic, emmenagogue, febrifuge and haemostatic[218, 238, 279]. It is used internally in the treatment of acute urinary tract infections (especially cystitis), urinary stones, constipation and failure to menstruate[238]. It is used externally to treat skin inflammations and swellings[238]. The old leaves are crushed and used for clearing the eyesight[218]. The plants are harvested just before the flowers open and are dried for later use[238].

nrakta E. Asia - China. ksacta A wide variety of habitats including sandy forest margins, dry hillsides and summits, forest and hillside grasslands, scrub on mountain slopes, rocky ravines, meadows and streamsides[266].

propta Seed - sow May/June in a cold frame. The seed usually germinates in 2 - 3 weeks. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer or autumn[1]. The seed can also be sown thinly in an outdoor seedbed in late spring, the young plants being planted out in late spring or the autumn[1]. Cuttings of half-ripe shoots, July in a frame[1]. Division in September[1]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Landscape Uses:Border, Container, Ground cover, Massing, Rock garden. Prefers a rich well-drained loamy neutral to alkaline soil in a sunny position[1, 238], but succeeds in most soils including dry ones[1]. A very ornamental plant[1], it is usually biennial in habit, but can be a short-lived perennial. There are many cultivars that are widely grown in gardens. Since these flower freely in their first year and then degenerate, they are usually treated

as annuals[200]. A very variable species in the wild, it has often been subdivided into up to eight different varieties[266]. Special Features:Attractive foliage, Naturalizing, Suitable for cut flowers, Fragrant flowers, Attractive flowers or blooms.

6.2.523 Adonis aestivalis

Pheasant's Eye, Summer pheasant's eye

5 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 0.3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyfxre7t hjonli

drutta *Adonis aestivalis* is a ANNUAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in June, and the seeds ripen in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista A toxic principle is present in very small quantities in the plant[13, 19, 65]. It is poorly absorbed so poisoning is unlikely[65]. The plant is poisonous to horses[240].

dwatta Cardiotonic Diuretic Laxative LithontripicThe plant is a cardiotonic, diuretic and stimulant[13, 46, 61]. Some caution is advised in the use of this remedy, see the notes above on toxicity. The flowers are considered to be diuretic, laxative and lithontripic[240].

nrakta S. Europe, N. Africa. ksacta Cornfields, usually on calcareous soils.

propta Seed - best sown in situ as soon as it is ripe in the autumn[1], though it can also be sown in situ in the spring[134].

nwatta Grows well in ordinary garden soil[1]. Prefers a moist well-drained soil in sun or semi-shade[200]. A greedy plant inhibiting the growth of nearby plants, especially legumes[54]. Very closely related to *A. annual*[200].

6.2.524 Clematis douglasii

Hairy Clematis

5 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta *Clematis douglasii* is a deciduous Perennial growing to 0.6 m (2ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to June, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no reports of toxicity have been seen for this species, some if not all members of this genus are mildly poisonous. The toxic principle is dissipated by heat or by drying[65].

tcanta Insulation Miscellany TinderThe seed floss makes an excellent tinder for starting fires, a spark from a flint will quickly ignite it[212]. The seed floss can be used as an insulation in shoes etc[212].

dwatta MiscellanyA decoction of the leaves has been used to treat headaches[257]. The root has been used in the treatment of congested nose pain[257].

nrakta Western N. America - British Columbia to Washington, east to Montana and Wyoming. ksacta Moist open areas of plains, hills and woods, up to 2,500 metres[212].

propta Seed - best sown as soon as it is ripe in a cold frame[164, 200]. Sow stored seed as soon as it is obtained in a cold frame. Pre-soak the seed for 12 hours in warm water and remove as much of the tail and outer coat as possible[164]. A period of cold stratification is beneficial[164]. The seed germinates in 1 - 9 months or more at 20°C[164]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for the first winter. Plant out in late spring or early summer, after the last expected frosts. Internodal cuttings of soft to

Taxodium distichum , 481
 Taxus baccata , 577
 Taxus brevifolia , 579
 Taxus canadensis , 307
 Taxus cuspidata , 275
 Taxus x media , 334
 Tephrosia virginiana , 510
 Thalictrum aquilegifolium , 703
 Thamnocalamus aristatus , 636
 Thamnocalamus spathiflorus , 637
 Thuja occidentalis , 104
 Thuja orientalis , 683
 Thuja plicata , 679
 Tilia americana , 69
 Tilia amurensis , 259
 Tilia chinensis , 264
 Tilia cordata , 41
 Tilia heterophylla , 256
 Tilia japonica , 571
 Tilia mongolica , 86
 Tilia oliveri , 579
 Tilia platyphyllos , 195
 Tilia tomentosa , 263
 Tilia tuan , 575
 Tilia x europaea , 39
 Tradescantia virginiana , 367
 Tragopogon crocifolius , 346
 Tragopogon dubius , 305
 Tragopogon porrifolius , 326
 Tragopogon pratensis , 95
 Trifolium incarnatum , 35
 Trifolium macrocephalum , 189
 Trifolium pratense , 527
 Trifolium repens , 185
 Trigonella foenum , 525
 Trillium erectum , 361
 Trillium grandiflorum , 464
 Trillium kamschatcicum , 467
 Trillium ovatum , 475
 Trillium sessile , 350
 Trillium smallii , 467
 Trillium tschonoskii , 474
 Tsuga canadensis , 424
 Tsuga caroliniana , 426
 Tsuga chinensis , 680
 Tsuga mertensiana , 699
 Tussilago farfara , 323

Ulmus americana , 101
 Ulmus davidiana , 403
 Ulmus glabra , 570
 Ulmus japonica , 373
 Ulmus laciniata , 409
 Ulmus macrocarpa , 335
 Ulmus parvifolia , 624
 Ulmus procera , 567
 Ulmus pumila , 405
 Ulmus rubra , 102
 Ulmus villosa , 424
 Ulmus wallichiana , 680
 Urospermum dalechampii , 721
 Urtica californica , 124
 Urtica dioica , 46

Valeriana officinalis , 372
 Valeriana sambucifolia , 398
 Valerianella locusta , 249
 Veratrum album , 498
 Veratrum californicum , 493
 Veratrum nigrum , 738
 Veratrum viride , 143
 Verbascum blattaria , 733
 Verbascum densiflorum , 496
 Verbascum lychnitis , 733
 Verbascum nigrum , 496
 Verbascum phlomoides , 737
 Verbascum pulverulentum , 167
 Verbascum thapsus , 145
 Verbena hastata , 147
 Verbena officinalis , 456
 Verbena stricta , 453

Verbena urticifolia , 515
 Veronica arvensis , 521
 Veronica chamaedrys , 155
 Veronica longifolia , 445
 Veronica officinalis , 154
 Veronica spuria , 158
 Veronicastrum sibiricum , 745
 Veronicastrum virginicum , 164
 Viburnum corylifolium , 693
 Viburnum cotinifolium , 593
 Viburnum cylindricum , 689
 Viburnum dentatum , 22
 Viburnum dilatatum , 593
 Viburnum edule , 295
 Viburnum erubescens , 640
 Viburnum erubescens gracilipes , 639
 Viburnum farreri , 595
 Viburnum foetens , 595
 Viburnum lantana , 434
 Viburnum lentago , 12
 Viburnum mongolicum , 450
 Viburnum nudum , 591
 Viburnum opulus , 82
 Viburnum phlebotrichum , 697
 Viburnum plicatum , 691
 Viburnum prunifolium , 108
 Viburnum rufidulum , 271
 Viburnum trilobum , 19
 Vicia americana , 187
 Vicia cracca , 191
 Vicia faba equina , 184
 Vicia faba major , 181
 Vicia faba minuta , 183
 Vicia gigantea , 188
 Vicia hirsuta , 188
 Vicia sativa , 184
 Vicia sativa leucosperma , 184
 Vinca minor , 501
 Viola cucullata , 97
 Viola odorata , 210
 Vitis acerifolia , 630
 Vitis aestivalis , 75
 Vitis aestivalis argentifolia , 71
 Vitis amurensis , 343
 Vitis arizonica , 639
 Vitis baileyana , 629
 Vitis cinerea floridana , 316
 Vitis coignetiae , 355
 Vitis cordifolia , 365
 Vitis flexuosa , 633
 Vitis labrusca , 269
 Vitis labruscana , 269
 Vitis monticola , 576
 Vitis mustangensis , 325
 Vitis palmata , 382
 Vitis parvifolia , 633
 Vitis riparia , 19
 Vitis romaneti , 630
 Vitis rotundifolia , 546

Waldsteinia ternata , 513
 Weigela coraensis , 687
 Weigela decora , 690
 Weigela floribunda , 698
 Weigela japonica , 729

Xanthoceras sorbifolium , 283

Yucca angustissima , 327
 Yucca filamentosa , 304
 Yucca glauca , 389

Zanthoxylum alatum , 589
 Zanthoxylum americanum , 109
 Zanthoxylum piperitum , 598
 Zanthoxylum planispinum , 594
 Zanthoxylum schinifolium , 642
 Zanthoxylum simulans , 590
 Zerkova serrata , 681
 Zizia aptera , 509
 Zizia aurea , 126
 Ziziphus jujuba , 550

semi-ripe wood, late spring in sandy soil in a frame[200]. Layering of old stems in late winter or early spring[200]. Layering of current seasons growth in early summer[200].

nwatta Succeeds in any fertile well-drained soil in a sunny position[233]. Prefers a deep moist soil with its roots in the shade[11, 200]. Dislikes poorly-drained heavy clay soils, but grows well in clay if grit is added for drainage[11, 200]. Dislikes light sandy soils[11]. Does well on chalk[1, 233]. Succeeds in acid as well as alkaline soils[200]. When planting out, in order to avoid the disease 'clematis wilt', it is best to plant the rootball about 8cm deeper in the soil. This will also serve to build up a good root crown of growth buds[200]. Plants seem to be immune to the predations of rabbits[233]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

6.2.525 Ajuga chamaepitys

Ground Pine, Yellow bugle

5 tlin 9 cyuc 0 kcaak 0 tcan 2 dwat 0.2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikwisslip hpa7tmwatli xre7t hjonli

drutta Ajuga chamaepitys is a ANNUAL growing to 0.2 m (0ft 8in) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

dwatta Antirheumatic Diuretic Emmenagogue Stimulant Urinary Women's complaintsThe leaves are diuretic, stimulant and emmenagogue[4]. The plant acts mainly on the urinary system and uterus[238]. It once had a high reputation in the treatment of rheumatism, dropsy, jaundice etc and has also proved of worth when used in conjunction with other herbs in the treatment of women's complaints[4]. The leaves are harvested in the summer and can be dried for later use[238].

nrakta CentraL and souther Europe, including Britain, to N. Africa and E. Asia. ksacta Very local in sandy and chalky arable fields and in open habitats in chalky grassland in southeastern England[4, 17].

propta Seed - sow spring in situ. Germination can be erratic[238].

nwatta Thrives in a poor dry soil in full sun[238]. Prefers a humus-rich moisture-retentive soil[200]. Plants are usually annual, but are sometimes short-lived perennials[200]. The whole plant smells of pine trees when crushed[17, 238].

6.2.526 Jurinea dolomiaea

5 tlin 9 cyuc 0 kcaak 0 tcan 1 dwat 0.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikwisslip hpa7tmwatli xre7t hjonli

drutta Jurinea dolomiaea is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

tcanta IncenseThe root extract is used as an incense[145]. The plant is used for incense[272].

dwatta Poulitice StomachicA decoction of the root is cordial[240]. It is given in the treatment of colic and puerperal fever[240]. The juice of the roots is used in the treatment of fevers[272]. The bruised root is applied as a poultice to eruptions[240].

nrakta W. Asia - Turkey and Iran, east to E. Asia - Himalayas. ksacta Open alpine slopes, 3200 - 3800 metres[145] propta Seed - we have no information on this species but suggest sowing the seed in a cold frame as soon as it is obtained. Only just cover the seed. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter.

Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring[200].

nwatta Succeeds in any ordinary soil in a sunny position[200].

6.2.527 Helleborus viridis

Green Hellebore

5 tlin 9 cyuc 0 kcaak 0 tcan 2 dwat 0.3 m hkuc hmim cyutli tcup hwicli hrasjlutnyikfripr hpa7tli flatprikwisslip hpa7tmwatli xre7t hjonli

drutta Helleborus viridis is a PERENNIAL growing to 0.3 m (1ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from February to April, and the seeds ripen from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland). It prefers moist soil.

pcista All parts of the plant are poisonous[9, 10, 65], this poison can possibly be absorbed through the skin[76].

tcanta ParasiticideA decoction of the roots is used as a parasiticide against body lice, fleas etc[76, 213]. This use is somewhat dangerous, see the notes above on toxicity. Plants are suitable for ground cover when spaced about 45cm apart each way[208].

dwatta Anthelmintic Antiemetic Cardiac Cathartic Diuretic Emetic Emmenagogue Hypotensive Irritant Narcotic Parasiticide PurgativeThe root is anthelmintic, cardiac, cathartic, diuretic, emetic, emmenagogue, irritant, violently narcotic and a drastic purgative[4, 9, 21, 46]. The dried root is used, it contains the alkaloids nervine, pseudo-nervine and veratridine[213]. It is best to harvest the root in the autumn[213]. The plant is useful for reducing blood pressure in various conditions of hypertension[213].

nrakta Central and western Europe, including Britain. ksacta Woods, scrub and sunny banks on moist chalk and limestone soils[9, 17, 187].

propta Seed - best sown as soon as it is ripe in a cold frame[1, 134]. Sow stored seed as early in the year as possible[1], it usually germinates in the autumn to spring. Seed can take 18 months to germinate. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a lightly shaded position in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. This species produces flowering plants in 2 - 3 years from seed[200]. Division after flowering or in autumn. Take care since the plant resents disturbance[111, 200].

nwatta Cultivation of this plant is not always easy, it prefers a rich limy soil in partial shade[187]. One report says that the plant requires an alkaline soil[17]. Succeeds in any good garden soil[1], preferring a moist well-drained rich loam in a sheltered position in partial shade[1, 4, 31, 111]. Succeeds when grown in the shade of a north-facing wall[233]. Does not object to lime[1]. Grows well in heavy clay soils[200]. Dislikes drought. Slugs are very fond of this plant and it will probably require some protection from them[187]. The various species in this genus hybridize freely[95]. Plants resent root disturbance and should be placed in their permanent positions whilst still small[200]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

6.2.528 Senecio viscosus

Sticky Groundsel, Sticky ragwort

5 tlin 9 cyuc 0 kcaak 0 tcan 1 dwat 0.4 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatprikwisslip hpa7tmwatli fyfkrx7t hjonli

drutta Senecio viscosus is a ANNUAL growing to 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to September, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is

pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

pcista All parts of the plant are poisonous to many mammals, including humans. The toxin affects the liver and has a cumulative affect[9, 65]. Some mammals, such as rabbits, do not seem to be harmed by the plant, and will often seek it out[4]. Various birds also eat the leaves and seeds[4].

dwatta Carminative Emetic The leaves are carminative and emetic[4].

nrakta Europe, including Britain, south and east from Scandinavia to Spain and W. Asia. ksacta Dry banks of ditches, dry waste ground, railway banks and tracks, sea shores[4, 17].

propta Seed - sow spring in situ.

nwatta See the plants native habitat for ideas on its cultivation needs. The plant has an unpleasant odour[4].

6.2.529 Semiaquilegia adoxoides

Tian Kui

5 tlin 9 cyuc 0 kcak 0 tcan 2 dwat 0.3 m hkuc
hmmhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikwis hpa7tmwatli xre7t hjonli

drutta Semiaquilegia adoxoides is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in May. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

dwatta Depurative Diuretic Febrifuge Skin Urinary The root is specifically recommended in the treatment of dry scabby skin and urinary disorders[218]. The tubers are depurative, diuretic and febrifuge[218].

nrakta E. Asia - China, Japan, Korea. ksacta Mountains, C. and S. Japan[58]. Damp and shady waste places in China[147]. Forests and roadsides at elevations of 100 - 1100 metres[266].

propta Seed - best sown as soon as it is ripe in a cold frame. It can be slow to germinate[200]. Stored seed can be sown in late winter in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring[200].

nwatta Succeeds in ordinary garden soil, preferring a moist but not wet soil and a sunny position[1]. Intolerant of heavy clay[200]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

6.2.530 Polygala amara

Bitter Milkwort

5 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 0.2 m hkuc
hmmhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikwis slip hpa7tmwatli xre7t hjonli

drutta Polygala amara is a PERENNIAL growing to 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been seen for this species, at least one member of this genus is said to be poisonous in large quantities.

dwatta Bitter Diaphoretic Diuretic Emollient Expectorant Galactagogue The herb is bitter, diaphoretic, diuretic, emollient, mildly expectorant, galactagogue[9, 21]. An infusion is used to treat stomach upsets, bladder and kidney disorders etc[9]. The plant is harvested as it comes into flower and dried for later use[9].

nrakta Europe, including Britain, south and east from Norway. ksacta Grassland and damp mountain pastures, especially on chalk and limestone[9, 17].

propta Seed - sow spring or autumn in a cold frame[214]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division. Cuttings of young shoots in a frame in late spring[1].

nwatta Prefers a moderately fertile moisture-retentive well-drained soil, succeeding in full sun if the soil remains moist throughout the growing season, otherwise it is best in semi-shade[200]. Dislikes shade according to another report.

6.2.531 Myosotis scorpioides

Water Forget-Me-Not, True forget-me-not
5 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 0.3 m hkuc
hmmhtut cyutli tcuphja7nhs6s hwicli hrasjlutnyikfrip hpa7tli flatprikwis hpa7tmwatli xre7t hjonli

drutta Myosotis scorpioides is an evergreen Perennial growing to 0.3 m (1ft) by 0.6 m (2ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, in flower from May to September, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can grow in water.

dwatta Used in the treatment of whooping cough and bronchitis[61].

nrakta Europe, including Britain, from Scandinavia south and east to N. Africa and the Himalayas N. America ksacta Wet places by streams and ponds[17].

propta Seed - sow outdoors in situ in late spring or early summer. Germination usually takes place within 2 - 4 weeks at 20°C. Division in spring[111]. Large divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer. Cuttings of young shoots, summer in a shady border[111].

nwatta Landscape Uses:Border, Container, Ground cover, Massing, Rock garden, Specimen, Woodland garden. Prefers a wet soil but thrives in a moist shady border[111]. Grows well in heavy clay soils. Does well on pond edges[200]. Prefers a sunny position[1]. Plants are hardy to about -20°C[187]. A long-lived species[187], it spreads freely when growing in marshy ground[233]. Members of this genus are rarely if ever troubled by browsing deer[233]. Special Features: Attractive foliage, North American native, Naturalizing, Wetlands plant, Suitable for cut flowers, Fragrant flowers.

6.2.532 Tanacetum cinerariifolium

Dalmation Pellitory, Pyrethrum

5 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 0.5 m hkuc
htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatprikwis slip hpa7tmwatli fyfjxre7t hjonli

drutta Tanacetum cinerariifolium is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from July to September, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

Sambucus melanocarpa, 652
Sambucus mexicana, 114
Sambucus microbotrys, 705
Sambucus nigra, 555
Sambucus nigra spp canadensis, 53
Sambucus pubens, 287
Sambucus racemosa, 286
Sambucus racemosa kamschatica, 291
Sambucus racemosa var. racemosa, 594
Samolus valerandi, 674
Sanguisorba canadensis, 442
Sanguisorba minor, 226
Sanguisorba obtusa, 443
Sanguisorba officinalis, 364
Sanguisorba stipulata, 441
Sanguisorba tenuifolia, 451
Sanicula europaea, 719
Saponaria officinalis, 502
Sarcobatus vermiculatus, 414
Saussurea pulchella, 145
Scabiosa columbaria, 723
Scabiosa fischeri, 462
Schisandra chinensis, 222
Schizophragma hydrangeoides, 684
Scilla scilloides, 472
Scirpus lacustris, 297
Scirpus maritimus, 573
Scorzonera hispanica, 562
Scorzonera mollis, 649
Scrophularia ningpoensis, 735
Scutellaria galericulata, 518
Scutellaria indica, 462
Secale cereale, 64
Secale cereale ancestrale, 113
Secale hybrids, 47
Secale strictum, 45
Secale strictum kuprijanovii, 64
Secale vavilovii, 119
Sedum acre, 455
Sedum aizoon, 470
Sedum arboroseum, 712
Sedum divergens, 720
Sedum kamschaticum, 462
Sedum lanceolatum, 714
Sedum oregonum, 716
Sedum spectabile, 673
Sedum stenopetalum, 713
Sedum telephium, 456
Sedum ternatum, 133
Semiaquilegia adoxoides, 744
Senecio cannabifolius, 440
Senecio erucifolius, 746
Senecio jacobaea, 507
Senecio nemorensis, 698
Senecio nemorensis fuchsii, 696
Senecio viscosus, 743
Senecio vulgaris, 721
Senna marilandica, 194
Shepherdia argentea, 33
Shepherdia canadensis, 7
Sidalcea malviflora, 574
Silphium integrifolium, 309
Silphium laciniatum, 387
Silphium laeve, 447
Silphium perfoliatum, 162
Silphium terebinthinaceum, 502
Silphium trifoliatum, 498
Sinapis alba, 615
Sinapis arvensis, 666
Sinofranchetia chinensis, 625
Sisymbrium officinale, 721
Smilax china, 557
Smilax glauca, 396
Smilax herbacea, 235
Smilax hispida, 387
Smilax rotundifolia, 272
Smyrniolum olusatrum, 603
Smyrniolum perfoliatum, 605
Solanum carolinense, 168
Solanum dulcamara, 495
Solidago canadensis, 663
Solidago canadensis scabra, 119

Solidago gigantea, 734
Solidago graminifolia, 148
Solidago odora, 112
Solidago rigida, 167
Solidago spathulata, 459
Solidago virgaurea, 477
Sophora davidii, 531
Sophora flavescens, 534
Sophora japonica, 186
Sorbaria sorbifolia, 28
Sorbopyrus auricularis, 270
Sorbopyrus species, 272
Sorbus alnifolia, 426
Sorbus americana, 25
Sorbus aria, 271
Sorbus aucuparia, 105
Sorbus austriaca, 630
Sorbus commixta, 684
Sorbus gracilis, 696
Sorbus hybrida, 430
Sorbus intermedia, 393
Sorbus japonica, 683
Sorbus lanata, 273
Sorbus latifolia, 220
Sorbus mougeotii, 559
Sorbus pohuashanensis, 430
Sorbus sambucifolia, 649
Sorbus scopulina, 412
Sorbus sitchensis, 443
Sorbus thibetica, 572
Sorbus torminalis, 547
Spinacia oleracea, 331
Spiraea alba, 708
Spiraea betulifolia aemiliana, 473
Spiraea blumei, 700
Spiraea douglasii, 494
Spiraea henryi, 693
Spiraea nervosa angustifolia, 699
Spiraea prunifolia, 441
Spiraea pyramidata, 702
Spiraea salicifolia, 443
Spiraea tomentosa, 163
Stachys affinis, 250
Stachys germanica, 499
Stachys hyssoipifolia ambigua, 476
Stachys officinalis, 714
Stachys palustris, 304
Staphylea bumalda, 450
Staphylea colchica, 690
Staphylea pinnata, 591
Staphylea trifolia, 287
Stellaria graminea, 310
Stellaria jamesiana, 322
Stellaria media, 377
Stephanandra incisa, 143
Stratiotes aloides, 506
Succisa pratensis, 412
Symphoricarpos albus laevigatus, 141
Symphoricarpos occidentalis, 150
Symphytum asperum, 308
Symphytum grandiflorum, 177
Symphytum officinale, 91
Symphytum orientale, 173
Symphytum tuberosum, 336
Symphytum uplandicum, 302
Syringa vulgaris, 139

Tagetes erecta, 20
Tagetes patula, 24
Tagetes tenuifolia, 23
Tamarix gallica, 437
Tamarix ramosissima, 28
Tamus communis, 437
Tanacetum balsamita, 618
Tanacetum cinerariifolium, 744
Tanacetum parthenium, 671
Tanacetum vulgare, 116
Taraxacum album, 371
Taraxacum megalorrhizon, 453
Taraxacum obovatum, 350
Taraxacum officinale, 564

Pyrus ussuriensis, 52

Quercus acutissima, 638
Quercus alba, 74
Quercus aliena, 358
Quercus bicolor, 217
Quercus cerris, 567
Quercus coccifera, 591
Quercus coccinea, 356
Quercus ellipsoidalis, 382
Quercus frainetto, 546
Quercus gambelii, 285
Quercus ilex, 198
Quercus imbricaria, 362
Quercus libani, 633
Quercus lyrata, 568
Quercus macrocarpa, 83
Quercus michauxii, 648
Quercus mongolica, 654
Quercus mongolica grosseserrata, 114
Quercus muehlenbergii, 315
Quercus nigra, 622
Quercus palustris, 263
Quercus petraea, 619
Quercus phellos, 622
Quercus prinoides, 391
Quercus prinus, 218
Quercus pubescens, 368
Quercus robur, 214
Quercus rubra, 72
Quercus serrata, 353
Quercus shumardii, 347
Quercus stellata, 267
Quercus undulata, 341
Quercus variabilis, 397
Quercus x bebbiana, 77
Quercus x hybrid, 69

Ranunculus aquatilis, 450
Ranunculus flammula, 511
Ranunculus kochii, 713
Ranunculus repens, 157
Raphanus sativus, 15
Raphanus sativus niger, 14
Ratibida columnifera, 473
Reseda luteola, 739
Reynoutria japonica, 294
Rhamnus carolinianus, 628
Rhamnus cathartica, 160
Rhamnus dahurica, 431
Rhamnus frangula, 160
Rhamnus japonica, 438
Rhamnus leptophyllus, 701
Rheum australe, 596
Rheum compactum, 668
Rheum palmatum tanguticum, 597
Rheum rhaponticum, 116
Rheum ribes, 664
Rheum x cultorum, 59
Rheum x hybridum, 63
Rhodiola rhodantha, 458
Rhodiola tibetica, 716
Rhus aromatica, 63
Rhus copallina, 235
Rhus diversiloba, 491
Rhus glabra, 55
Rhus potaninii, 483
Rhus punjabensis, 581
Rhus punjabensis sinica, 580
Rhus radicans, 491
Rhus succedanea, 431
Rhus trilobata, 238
Rhus typhina, 231
Rhus vernix, 161
Ribes aciculare, 91
Ribes alpinum, 20
Ribes altissimum, 592
Ribes ambiguum, 678
Ribes aureum, 57
Ribes burejense, 242
Ribes cereum, 370

Ribes distans, 365
Ribes divaricatum, 238
Ribes fasciculatum, 451
Ribes fragrans, 98
Ribes himalense, 599
Ribes hirtellum, 305
Ribes inebrians, 401
Ribes inerme, 648
Ribes lacustre, 305
Ribes missouriense, 324
Ribes nigrum, 208
Ribes odoratum, 234
Ribes rubrum, 244
Ribes sanguineum, 649
Ribes sativum, 612
Ribes uva, 207
Ribes x culverwellii, 543
Robinia fertilis, 193
Robinia hispida, 193
Robinia luxurians, 189
Robinia neomexicana, 190
Robinia pseudoacacia, 182
Robinia viscosa, 38
Rosa canina, 85
Rosa centifolia, 662
Rosa gallica, 419
Rosa multiflora, 348
Rosa nutkana, 297
Rosa pisocarpa, 647
Rosa rugiflora, 346
Rosa rugosa, 43
Rosa villosa, 240
Rosa virginiana, 124
Rosa woodsii, 398
Rosa x damascena, 384
Rubus adenophorus, 653
Rubus affinis, 420
Rubus allegheniensis, 86
Rubus amabilis, 601
Rubus arcticus, 11
Rubus bellobatus, 654
Rubus buergeri, 646
Rubus caesius, 355
Rubus canadensis, 58
Rubus coreanus, 695
Rubus deliciosus, 408
Rubus flagellaris, 99
Rubus fruticosus, 541
Rubus idaeus, 206
Rubus illecebrosus, 322
Rubus kuntzeanus, 595
Rubus laciniatus, 205
Rubus occidentalis, 55
Rubus odoratus, 88
Rubus parviflorus, 88
Rubus phoenicolasius, 203
Rubus procerus, 201
Rubus species, 646
Rubus spectabilis, 301
Rubus strigosus, 88
Rubus thibetanus, 647
Rudbeckia hirta, 493
Rudbeckia laciniata, 143
Rumex acetosa, 49
Rumex acetosella, 248
Rumex alpinus, 243
Rumex crispus, 341
Rumex hydroalpathum, 706
Rumex obtusifolius, 444
Rumex patientia, 606
Rumex scutatus, 566
Ruta graveolens, 457

Sabatia angularis, 705
Salix caprea, 429
Salix hybrids, 16
Salix purpurea, 435
Salix viminalis, 433
Salvia sclarea, 660
Sambucus caerulea, 233
Sambucus ebulus, 445

pcista Some people are highly allergic to this plant[160]. Prolonged contact with the dried flowers can lead to allergic dermatitis, allergic rhinitis and asthma in humans[268].

tcanta Insecticide RepellentThe dried flower buds are the source of the insecticide 'Pyrethrum'[1, 4, 14, 18, 46, 57, 61]. The pyrethrins are produced in the yellow disc florets[169]. The highest pyrethrin content is from the flowers when they are in full bloom (1.22%) and lowest in the preceding period (0.71%)[240]. This insecticide also kills many beneficial insects, though it is relatively harmless to mammals[4]. Another report says that it is non-toxic to mammals[238]. It is best used in the evening so that it will have lost much of its virulence by the morning[201]. Steep two handfuls of the dried powdered flowers in one litre of hot water for an hour. This mixture can be either pureed or strained and then used as a spray[201]. Once dried, the flowers or the powder retain their insecticidal properties almost indefinitely[238]. The growing plant can be used as an insect repellent in the garden[14, 18, 20]. Effective against mosquitoes and ants[201].

dwatta VermifugeDalmatian pellitory is not used medicinally, though research has shown that the flowers possess weak antibiotic activity[268]. The flowers are the main source of the insecticide pyrethrum, which is toxic to insects but not to mammals. It has sometimes been used as a vermifuge in China[147].

nrakta Europe - Dalmatia, Yugoslavia. *ksacta* Rocky ground[50], usually by the seashore[4].

propta Seed - sow spring in a greenhouse. Only just cover the seed and do not allow the pot to dry out. Prick out the seedlings into individual pots once they are large enough to handle and grow them on in the greenhouse for their first winter. Plant out in late spring or early summer. Division in spring. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring.

nwatta Industrial Crop: Pesticide Management: Hay Minor Global CropSucceeds in an ordinary garden soil[1]. Prefers a rich soil with plenty of humus[147]. Prefers a pebbly, calcareous dry soil in a sunny position[4]. When grown in moist climates the plants often die after flowering[4].Tolerates a pH in the range 5.2 to 7.5. Pyrethrum is widely cultivated as a source of an insecticide[57, 61], the growing plant is also said to repel insects from plants growing nearby[14, 18, 20].

6.2.533 *Potentilla hippiana*

Woolly Cinquefoil
5 tlin 9 cyuc 0 kcaak 0 tcan 1 dwat 0.6 m hkuc
hmimhtut cyutli tcup hwicli hrasjltutnyik hpa 7tli flatpriklwish-som hpa 7tmwatli fyfxre 7t hjonli

drutta *Potentilla hippiana* is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in saline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

dwatta Oxytoxic Poulitce SalveThe whole plant is oxytoxic, poultice and salve[155]. An infusion of the plant has been used to expedite childbirth[257]. The plant has been used as a lotion on burns and a poultice of the fresh leaves applied to injury[257]. The plant is dried, powdered and applied to sores[257].

nrakta Western N. America - Minnesota to British Columbia, south to New Mexico and Arizona. *ksacta* Dry soils[235]. Open grassland sagebrush, often on saline soils, to juniper scabland and pine forests of the foothills and lower elevations in the mountains[60].

propta Seed - sow early spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring. Larger divisions

can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Easily grown in a well-drained loam, preferring a position in full sun but tolerating shade[1]. Prefers an alkaline soil but tolerates a slightly acid soil[200]. Members of this genus are rarely if ever troubled by browsing deer[233].

6.2.534 *Erysimum capitatum*

Coastal Wallflower, Sanddune wallflower, Contra Costa wallflower, San Luis Obispo wallflower, Pursh' 5 tlin 9 cyuc 0 kcaak 0 tcan 2 dwat 0.6 m hkuc
htut cyutli kyuctup hwicli hyhshrasjltutnyik hpa 7tli priklwis hpa 7tmwatli xre 7t hjonli

drutta *Erysimum capitatum* is a BIENNIAL/PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

dwatta Antirheumatic Odontalgic Poulitce SkinA preventative against sun burn, the plant was ground up then mixed with water and applied to the skin[213]. It relieves the pain caused by overexposure to heat[155]. A poultice of the whole pounded plant has been applied to open fresh wounds and rheumatic joints[257]. An infusion of the whole plant has been used as a wash on aching muscles[257]. The crushed leaves have been sniffed as a treatment for headaches[257]. A poultice of the warmed root has been applied to treat the pain of toothache[257]. An infusion of the crushed seed has been drunk and used externally in the treatment of stomach or bowel cramps[257].

nrakta Western N. America - British Columbia to Indiana, south to Texas and California. *ksacta* Found in many habitats from southern British Columbia to California at 750 - 3600 metres[155]. Open dry flats and hillsides, from the lowest valleys to about 3,000 metres in the mountains[212].

propta Seed - sow spring in an outdoor seedbed. Germination usually takes place within 3 weeks. Plant the seedlings into their permanent positions when they are large enough to handle. If seed is in short supply, it can be sown in spring in pots in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in early summer.

nwatta Requires a well-drained soil and a sunny position[200]. Dislikes acid soils[200]. Tolerates poor soils[200]. Grows well on a sunny wall and is indeed longer lived in such a position[166]. A polymorphic species[155], it is possibly a form of *E. asperum*[1].

6.2.535 *Veronicastrum sibiricum*

Blackroot
5 tlin 9 cyuc 0 kcaak 0 tcan 2 dwat 0.8 m hkuc
hmimhtut cyutli tcup hwicli hrasjltutnyik hpa 7tli flatpriklwish hpa 7tmwatli xre 7t hjonli

drutta *Veronicastrum sibiricum* is a PERENNIAL growing to 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

dwatta The root is antimicrobial and hepatic[279]. It is used in Korea in the treatment of the common cold and as a liver tonic[279].

nrakta E. Asia - China, Japan, Korea, Siberia. *ksacta* Grassy areas in mountains and lowlands[279]. Trailsides, grassy slopes and thickets at elevations below 2500 metres in northern China[266].

propta Seed - sow autumn in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. If you have

sufficient quantity the seed can be sown outdoors in situ in the autumn or the spring. Division in autumn or spring[200]. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring.

nwatta Easily grown in a moderately fertile moisture retentive well drained soil[200]. Prefers cool summers[200]. Prefers a sunny position[188].

6.2.536 Lithospermum erythrorhizon

Lithospermum

5 tlin 9 cyuc 0 kcaak 0 tcan 3 dwat 0.7 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

drutta Lithospermum erythrorhizon is a PERENNIAL growing to 0.7 m (2ft 4in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to September, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

tcanta DyeA purple dye is obtained from the root[46, 61, 218]. It is harvested in the spring[178]. It is much liked but the colour is fugitive and production costs high[174].

dwatta Antitumor Contraceptive Depurative Eczema Febrifuge SalveAll parts of the plant are antitumor, cardiotonic, contraceptive, depurative and febrifuge[147, 174, 176, 218, 238]. It is used internally in the treatment of irritant skin conditions, measles, chicken pox, boils, carbuncles, hepatitis and skin cancer[238]. Externally it is used to treat nappy rash, burns, cuts, wounds, abscesses, eczema and haemorrhoids[147, 174, 176, 218, 238]. The plant is an ingredient of commercial skin care creams[238]. The plants are harvested when in flower, the roots in the autumn[238]. They are dried for later use[238].

nrakta E. Asia - Eastern China, Japan and Korea. ksacta Grassy slopes in mountains and hills all over Japan[58].

propta Seed - sow spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings. Division in the autumn[238].

nwatta Requires a warm sunny position in a moderately fertile well-drained soil[1, 200]. Prefers a neutral to alkaline soil and also succeeds in partial shade[238]. Plants are hardy to at least -15°C[238]. This species is cultivated in Japan[46] (as a dye plant?).

6.2.537 Eryngium planum

Plains eryngo, Blue Cap, Eringoe, Eryngo, Flat Sea Holly

5 tlin 9 cyuc 0 kcaak 0 tcan 1 dwat 0.7 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta Eryngium planum is a PERENNIAL growing to 0.7 m (2ft 4in) by 0.4 m (1ft 4in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure.

dwatta DiureticThe plant is diuretic[61]. It is used in the treatment of whooping cough[238].

nrakta E. Europe through Russia to central and south-western Asia. ksacta Dry soils in E. Europe[50]. Locally common in orchards and cultivated areas in Kashmir at 1700 me-

tres[145]. A weed of disturbed habitats at 500 - 1500 metres in Tibet[266].

propta Seed - best sown as soon as it is ripe in early autumn on the surface of a well-drained compost in a cold frame[200]. The seed can also be sown in spring. It usually germinates in 5 - 90 days at 20°C. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in early spring or autumn. Take care since the plant resents root disturbance[200]. Root cuttings in autumn or winter[200].

nwatta Landscape Uses:Border, Rock garden, Seashore, Specimen. Requires a well-drained soil and a sunny position[1]. Prefers a light sandy soil but tolerates most soil types including lime and poor gravels[200]. When grown in soils that are too rich the stems will need staking before they flop[187]. Established plants are drought tolerant[190]. Plants are hardy to about -25°C[187]. Plants should be put in their final position whilst small since they resent root disturbance[200]. A very ornamental plant[1], there are some named varieties[233]. A good bee plant. Special Features:Not North American native, Naturalizing, Suitable for cut flowers, Suitable for dried flowers, Extended bloom season in Zones 9A and above, Attractive flowers or blooms.

6.2.538 Senecio grandifolius

Hoary Groundsel, Hoary ragwort

5 tlin 9 cyuc 0 kcaak 0 tcan 2 dwat 0.6 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyikrip hpa7tli flatprikliwis hpa7tmwatli fyifxre7t hjonli

drutta Senecio grandifolius is a PERENNIAL growing to 0.6 m (2ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

pcista All parts of the plant are poisonous to many mammals, including humans. The toxin affects the liver and has a cumulative affect[9, 65]. Some mammals, such as rabbits, do not seem to be harmed by the plant, and will often seek it out[4]. Various birds also eat the leaves and seeds[4].

dwatta Anthelmintic Antiscorbutic Diaphoretic Diuretic Emmenagogue Poulitice PurgativeThe plant is used in plasters, ointments and poultices[4]. This species is related to groundsel, *S. vulgaris*, and is said to have similar properties[4]. These are: The whole herb is anthelmintic, antiscorbutic, diaphoretic, diuretic, emmenagogue and purgative[4, 9, 21, 54]. It is often used as a poultice and is said to be useful in treating sickness of the stomach, whilst a weak infusion is used as a simple and easy purgative[4]. The plant can be harvested in May and dried for later use, or the fresh juice can be extracted and used as required[4]. Use with caution[21], see notes above on toxicity.

nrakta Central and southern Europe, including Britain, north to Denmark and Lithuania, east to W. Asia. ksacta Dry banks, field borders, grassy slopes and roadsides, in limestone and chalky districts and especially on heavy soils[4, 17].

propta Seed - sow spring in situ. Division in spring.

nwatta We have very little information on the cultivation needs of this plant but, judging by its native habitats, it is likely to require a sunny position and to succeed in most moderate to heavy soils, including those of an alkaline nature[K].

6.2.539 Aristolochia clematitidis

Birthwort

5 tlin 9 cyuc 0 kcaak 0 tcan 2 dwat 0.7 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis hpa7tmwatli xre7t hjonli

Philadelphus microphyllus, 701
Phleum pratense, 496
Phlomis tuberosa, 663
Phoradendron leucarpum, 733
Phragmites australis, 204
Phyllostachys aureosulcata, 556
Phyllostachys flexuosa, 587
Physalis alkekengi franchetii, 673
Physalis pruinosa, 327
Physalis subglabrata, 363
Phytolacca americana, 298
Phytolacca esculenta, 656
Picea omorika, 338
Picea orientalis, 380
Picrasma quassioides, 685
Pimpinella major, 446
Pimpinella saxifraga, 475
Pinellia pedatisecta, 751
Pinellia ternata, 715
Pinellia tripartita, 750
Pinus nigra, 134
Plantago asiatica, 716
Plantago lanceolata, 669
Plantago major, 116
Plantago maritima, 576
Plantago media, 650
Platanus occidentalis, 422
Platycodon grandiflorus, 383
Pleioblastus simonii, 590
Poa pratensis, 144
Polygala amara, 744
Polygala tenuifolia, 713
Polygala vulgaris, 711
Polygonatum biflorum, 123
Polygonatum commutatum, 379
Polygonatum falcatum, 390
Polygonatum humile, 394
Polygonatum multiflorum, 345
Polygonatum odoratum, 373
Polygonatum odoratum thunbergii, 384
Polygonatum pubescens, 117
Polygonatum sibiricum, 121
Polygonatum verticillatum, 395
Polygonum alpinum, 390
Polygonum arenastrum, 406
Polygonum aviculare, 339
Polygonum bistorta, 320
Polygonum bistortoides, 319
Polygonum japonicum, 293
Polygonum lapathifolium, 471
Polygonum persicaria, 461
Polygonum sachalinense, 414
Polygonum viviparum, 94
Popodium vulgare, 129
Populus 'Balsam Spire', 481
Populus alba, 136
Populus angustifolia, 135
Populus deltoides, 100
Populus fremontii, 26
Populus grandidentata, 27
Populus hybrids, 16
Populus maximowiczii, 495
Populus nigra, 133
Populus sieboldii, 424
Populus simonii, 24
Populus tremuloides, 26
Populus trichocarpa, 421
Populus x canadensis, 479
Populus x canescens, 480
Potentilla anserina, 312
Potentilla bicolor, 701
Potentilla egedei, 396
Potentilla erecta, 467
Potentilla fruticosa, 28
Potentilla hippiana, 745
Potentilla multifida, 120
Potentilla nepalensis, 672
Potentilla norvegica, 174
Potentilla reptans, 446
Potentilla rupestris, 463
Potentilla simplex, 175
Primula auricula, 173

Primula denticulata, 414
Primula elatior, 127
Primula involucrata, 509
Primula macrophylla, 737
Primula reticulata, 741
Primula veris, 314
Primula vulgaris, 613
Prinsepia sinensis, 385
Prinsepia uniflora, 375
Prunella grandiflora, 401
Prunella vulgaris, 132
Prunus alleghaniensis, 292
Prunus americana, 81
Prunus americana lanata, 78
Prunus angustifolia, 592
Prunus angustifolia watsonii, 559
Prunus avium, 51
Prunus besseyi, 60
Prunus buergeriana, 395
Prunus canescens, 593
Prunus cerasifera, 551
Prunus cerasifera divaricata, 222
Prunus cerasus, 139
Prunus cerasus austera, 79
Prunus cerasus caproniana, 80
Prunus cerasus frutescens, 92
Prunus davidiana, 344
Prunus domestica, 200
Prunus domestica italica, 541
Prunus emarginata, 637
Prunus fruticosa, 303
Prunus glandulosa, 655
Prunus hortulana, 583
Prunus incisa, 587
Prunus insititia, 538
Prunus japonica, 303
Prunus japonica nakai, 326
Prunus maritima, 62
Prunus munsoniana, 574
Prunus pedunculata, 337
Prunus persica, 540
Prunus persica nucipersica, 227
Prunus pumila, 65
Prunus salicina, 641
Prunus serotina, 50
Prunus sibirica, 288
Prunus spinosa, 292
Prunus tomentosa, 89
Prunus x cistena, 352
Pseudocystodonia sinensis, 635
Pseudosasa japonica, 641
Psoralea esculenta, 179
Psoralea orbicularis, 532
Ptelea baldwinii, 687
Ptelea trifoliata, 364
Ptelea trifoliata mollis, 358
Pterocarya rhoifolia, 681
Pueraria montana lobata, 524
Pulmonaria saccharata, 475
Pycnanthemum flexuosum, 452
Pycnanthemum muticum, 452
Pycnanthemum pilosum, 404
Pycnanthemum virginianum, 366
Pyrocystodonia danielii, 638
Pyrus amygdaliformis, 631
Pyrus balsanae, 579
Pyrus betulaeifolia, 353
Pyrus bretschneideri, 226
Pyrus calleryana, 627
Pyrus communis, 402
Pyrus communis sativa, 202
Pyrus elaeagnifolia, 337
Pyrus elaeagnifolia kotschyana, 385
Pyrus nivalis, 628
Pyrus pashia, 277
Pyrus phaeocarpa, 385
Pyrus pyraeaster, 585
Pyrus pyrifolia, 548
Pyrus pyrifolia culta, 548
Pyrus regellii, 632
Pyrus salicifolia, 370
Pyrus serrulata, 684

Malus pumila nervosa, 82
Malus pumila paradisiaca, 81
Malus sargentii, 390
Malus sieversii, 278
Malus sikkimensis, 634
Malus spectabilis, 276
Malus sylvestris, 274
Malus toringo, 369
Malus toringoides, 352
Malus transitoria, 339
Malus trilobata, 627
Malus tschonoskii, 77
Malus x adstringens, 119
Malus x astracantha, 109
Malus x micromalus, 394
Malus x robusta, 106
Malus x soulardii, 393
Malus yunnanensis, 107
Malva alcea, 209
Malva moschata, 45
Malva neglecta, 256
Malva sylvestris, 313
Marrubium vulgare, 152
Matricaria matricarioides, 700
Matricaria recutita, 717
Matthiola incana, 677
Medicago lupulina, 188
Medicago sativa, 180
Melanthium virginicum, 499
Melilotus indicus, 532
Melittis melissophyllum, 710
Menispermum canadense, 490
Menispermum davuricum, 487
Mentha aquatica, 610
Mentha arvensis, 330
Mentha arvensis piperascens, 330
Mentha arvensis villosa, 334
Mentha longifolia, 658
Mentha requienii, 615
Mentha saturioides, 676
Mentha spicata, 67
Mentha suaveolens, 665
Mentha x gracilis, 613
Mentha x piperita citrata, 130
Mentha x piperita officinalis, 96
Mentha x piperita vulgaris, 66
Mentha x smithiana, 605
Mentha x villosa alopecuroides, 249
Mertensia ciliata, 470
Mertensia longiflora, 157
Mertensia oblongifolia, 463
Mertensia paniculata, 454
Mespilus germanica, 556
Mimulus guttatus, 679
Mimulus lewisii, 372
Miscanthus sinensis, 435
Miscanthus x giganteus, 486
Mitella diphylla, 171
Monarda citriodora, 668
Monarda clinopodia, 448
Monarda didyma, 333
Monarda fistulosa, 309
Monarda menthifolia, 144
Monarda punctata, 712
Morus alba, 219
Morus alba multicaulis, 226
Morus bombycis, 634
Morus cathayana, 626
Morus microphylla, 651
Morus mongolica, 415
Morus nigra, 536
Morus rubra, 270
Muscari botryoides, 156
Muscari comosum, 326
Muscari neglectum, 377
Myosotis alpestris, 175
Myosotis scorpioides, 744
Myrica gale, 8
Myrica heterophylla, 526
Myricaria germanica, 731
Myrrhis odorata, 242

Narcissus jonquilla, 461
Narcissus poeticus, 517
Narcissus pseudonarcissus, 518
Nemopanthus mucronatus, 452
Nepeta raphanorrhiza, 362
Nyssa sylvatica, 410

Oemleria cerasiformis, 652
Ononis repens, 529
Ononis spinosa, 528
Onopordum acanthium, 661
Ophioglossum vulgatum, 465
Ophrys holoserica, 670
Ophrys insectifera, 666
Ophrys sphegodes, 675
Oplopanax horridus, 381
Oplopanax japonicum, 645
Opopanax chironium, 734
Orchis coriophora, 409
Orchis italica, 380
Orchis laxiflora, 410
Orchis mascula, 391
Orchis militaris, 347
Orchis morio, 371
Orchis ustulata, 387
Origanum vulgare, 251
Origanum vulgare hirtum, 255
Orixa japonica, 645
Ornithogalum pyrenaicum, 672
Osmorhiza chilensis, 617
Osmorhiza claytonii, 612
Osmorhiza longistylis, 606
Osmorhiza occidentalis, 606
Osmunda cinnamomea, 357
Osmunda claytoniana, 128
Osmunda japonica, 662
Osmunda regalis, 494
Ostrya virginiana, 159
Oxalis acetosella, 94
Oxalis corniculata, 378
Oxalis exilis, 388
Oxalis grandis, 676
Oxalis violacea, 320
Oxyria digyna, 21

Pachysandra terminalis, 386
Packera aurea, 175
Packera obovata, 171
Paeonia anomala, 455
Paeonia caucasica, 521
Paeonia delavayi, 706
Paeonia lactiflora, 477
Paeonia officinalis, 472
Paeonia suffruticosa, 696
Panax ginseng, 671
Panax pseudoginseng, 703
Panax quinquefolius, 154
Panax trifolius, 152
Panicum capillare, 375
Papaver rhoeas, 337
Parthenocissus quinquefolia, 100
Parthenocissus tricuspidata, 425
Passiflora mollissima, 573
Pastinaca sativa, 241
Perovskia atriplicifolia, 710
Petasites albus, 349
Petasites hybridus, 499
Petasites hyperboreus, 375
Petasites japonicus, 614
Peucedanum cervaria, 735
Peucedanum oreoselinum, 507
Peucedanum ostruthium, 340
Peucedanum palustre, 709
Phalaris canariensis, 665
Phalaris minor, 703
Phaseolus coccineus, 4
Phaseolus vulgaris, 5
Phellodendron amurense, 137
Phellodendron chinense, 484
Phellodendron lavalleyi, 685
Philadelphus lewisii, 489

drutta Aristolochia clematitis is a PERENNIAL growing to 0.7 m (2ft 4in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf from May to November, in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The root and stem are poisonous[19]. The plant contains aristolochic acid, this has received rather mixed reports on its toxicity. According to one report aristolochic acid stimulates white blood cell activity and speeds the healing of wounds, but is also carcinogenic and damaging to the kidneys[254]. Another report says that it is an active antitumor agent but is too toxic for clinical use[218]. Another report says that aristolochic acid has anti-cancer properties and can be used in conjunction with chemotherapy and radiotherapy and that it also increases the cellular immunity and phagocytosis function of the phagocytic cells[176].

dwatta Abortifacient Antiinflammatory Antispasmodic Diaphoretic Eczema Emmenagogue Febrifuge Oxytotic StimulantBirthwort has a very long history of medicinal use, though it has been little researched scientifically and is little used by present-day herbalists[254, 268]. It is an aromatic tonic herb that stimulates the uterus, reduces inflammation, controls bacterial infections and promotes healing[238]. The juice from the stems was used to induce childbirth[268]. The plant contains aristolochic acid which, whilst stimulating white blood cell activity and speeding the healing of wounds, is also carcinogenic and damaging to the kidneys[254]. The flowering herb, with or without the root, is abortifacient, anti-inflammatory, antispasmodic, diaphoretic, emmenagogue, febrifuge, oxytotic and stimulant[7, 9, 21, 100, 200]. Another report says that the root is used on its own[238] whilst a third says that either the fresh flowering herb or the dried rootstock can be used[268]. The plant should not be used internally without experienced supervision, externally it is used in the treatment of slow-healing cuts, eczema, infected toe and finger nails etc[9]. Use with caution, internal consumption can cause damage to the kidneys and uterine bleeding[7, 9, 21]. It should not be used by pregnant women[238].

nrakta E. and S.E. Europe. Naturalized in Britain[17]. *ksacta* Waste ground, gardens, orchards etc[9].

propta Seed - best sown in a greenhouse as soon as it is ripe in the autumn. Pre-soak stored seed for 48 hours in hand-hot water and surface sow in a greenhouse[134]. Germination usually takes place within 1 - 3 months at 20°C[134]. Stored seed germinates better if it is given 3 months cold stratification at 5°C[200]. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant out in late spring or early summer after the last expected frosts. Division in autumn[200]. Root cuttings in winter[200].

nwatta Prefers a well-drained loamy soil, rich in organic matter, in sun or semi-shade[1, 134]. Succeeds in ordinary garden soil[134]. The plant has an invasive root system[233]. Most species in this genus have malodorous flowers, often smelling like decaying flesh[245], that are pollinated by flies[200]. The insects that pollinate this plant become trapped in the hairy throat of the flower[233]. Birthwort was formerly cultivated as a medicinal plant in most of Europe[50].

6.2.540 Iris sanguinea

Blood iris
5 tin 9 cyuc 0 kcaak 0 tcan 1 dwat 0.8 m hkuc
hmimhtut cyutli tcuphja7n hwicli hrasjlutnykfrip hpa7tli flat-prikklwis hpa7tmwatli fyfjxre7t hjonli

drutta *Iris sanguinea* is a PERENNIAL growing to 0.8 m (2ft 7in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in June, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light

woodland) or no shade. It prefers moist or wet soil.

pcista Many plants in this genus are thought to be poisonous if ingested, so caution is advised[65]. The roots are especially likely to be toxic[238]. Plants can cause skin irritations and allergies in some people[238].

tcanta InsecticideAn insecticide is obtained from the plant[218]. (from the root?)

dwatta ExpectorantExpectorant[218].

nrakta E. Asia - Korea, Japan. *ksacta* Damp meadows, sunny pond banks, mountain stream banks and hillsides around 500 metres[266].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed should be sown as early in the year as possible in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse or cold frame for their first year. Plant out into their permanent positions in late spring or early summer. Division, best done in August/September after flowering but can also be done in April. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta An easily grown plant, it prefers a humus-rich soil[79, 200], succeeding in a moist border or with water[42, 79]. Grows well in heavy clay soils. Plants are very cold tolerant, but they can be damaged when dormant if the soil is too moist[79]. A very ornamental plant, there are some named varieties[200]. Plant the bulbs out very shallowly[79]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233].

6.2.541 Gentiana puberulenta

Downy gentian
5 tin 9 cyuc 0 tcan 3 dwat 0.4 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyk hpa7tli flatprikklwis hpa7tmwatli xre7t hjonli

drutta *Gentiana puberulenta* is a PERENNIAL growing to 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bumblebees, butterflies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

dwatta Antidote Appetizer Bitter Digestive Stomachic TonicThe root is said to be an antidote to snakebites[61]. This N. American species has medicinal properties practically identical with the European gentians[4]. The following notes are based on the general uses of *G. lutea* which is the most commonly used species in the West[K]. *Gentian* root has a long history of use as a herbal bitter in the treatment of digestive disorders and is an ingredient of many proprietary medicines. It contains some of the most bitter compounds known and is used as a scientific basis for measuring bitterness[238]. It is especially useful in states of exhaustion from chronic disease and in all cases of debility, weakness of the digestive system and lack of appetite[4]. It is one of the best strengtheners of the human system, stimulating the liver, gall bladder and digestive system[238], and is an excellent tonic to combine with a purgative in order to prevent its debilitating effects[4]. The root is anthelmintic, anti-inflammatory, antiseptic, bitter tonic, cholagogue, emmenagogue, febrifuge, refrigerant, stomachic[4, 7, 9, 14, 21, 165, 238]. It is taken internally in the treatment of liver complaints, indigestion, gastric infections and anorexia[238]. It should not be prescribed for patients with gastric or duodenal ulcers[238]. The root is harvested in the autumn and dried for later use[4]. It is quite likely that the roots of plants that have not flowered are the richest in medicinal properties[4].

nrakta Central N. America - Manitoba to Ontario, south to Kansas and Arkansas. *ksacta* Prairies and other grassy places[200, 239].

propta Seed - best sown as soon as it is ripe in a light position in a cold frame[200]. It can also be sown in late winter or early spring but the seed germinates best if given a period of cold stratification and quickly loses viability when stored, with older seed germinating slowly and erratically[200, 239].

It is advantageous to keep the seed at about 10°C for a few days after sowing, to enable the seed to imbibe moisture[239]. Following this with a period of at least 5 - 6 weeks with temperatures falling to between 0 and -5°C will usually produce reasonable germination[239]. It is best to use clay pots, since plastic ones do not drain so freely and the moister conditions encourage the growth of moss, which will prevent germination of the seed[239]. The seed should be surface-sown, or only covered with a very light dressing of compost. The seed requires dark for germination, so the pots should be covered with something like newspaper or be kept in the dark[239]. Pot up the seedlings into individual pots as soon as they are large enough to handle and grow on in light shade in the greenhouse for at least their first winter. The seedlings grow on very slowly, taking 2 - 7 years to reach flowering size[239]. When the plants are of sufficient size, place them out into their permanent positions in late spring or early summer. Division in March[111]. Most members of this genus have either a single tap-root, or a compact root system united in a single root head, and are thus unsuitable for division[239]. Cuttings of basal shoots in late spring[238].

nwatta In general, gentians require a moist well-drained soil in a sheltered position, a certain minimum of atmospheric humidity, high light intensity but a site where temperatures are not too high[239]. They are therefore more difficult to grow in areas with hot summers and in such a region they appreciate some protection from the strongest sunlight[200, 239]. Most species will grow well in the rock garden[200]. This species requires a fairly dry site with good drainage[239]. Plants are intolerant of root disturbance[200]. A moisture loving plant, preferring to grow with full exposure to the sun but with plenty of underground moisture in the summer, it grows better in the north and west of Britain[1]. This species is closely related to *G. affinis*[239].

6.2.542 Delphinium semibarbatum

Zalil
5 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 0.5 m hkuc
htuc cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis
hpa7tmwatli xre7t hjonli

drutta Delphinium semibarbatum is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to July, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista All parts of the plant are toxic[65, 172]. The plant is most toxic when it is young[200].

dwatta Anodyne Detergent Diuretic PouliticeThe plant is considered to be anodyne, detergent and diuretic[240]. It is used in the treatment of jaundice, dropsy and troubles of the spleen[240]. It is used externally as a poultice for swellings[240].

nrakta W. Asia - Afghanistan and Iran. ksacta Not known

propta Seed - sow March/April in a cold frame or May outdoors[111]. Keep moist and in a shady position until germination takes place[175]. The seed has a limited viability so it should be stored in a sealed container at about 3°C[200]. Temperatures above 15°C inhibit germination[175]. The seed usually germinates in 2 - 9 weeks at 15°C[175]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in the summer. Cuttings of basal shoots in April/May, taken before they become hollow at the base, and planted in a cold frame[111]. Division in spring[111] or early autumn[200].

nwatta Prefers a rich well-drained soil that stays moist in the summer[111, 187]. Dislikes water-logged soils[200], it is liable to die out in heavy soils over winter[111]. Requires an open sunny position[188]. This species is not reliably hardy in cool temperate zones[200]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

6.2.543 Helianthemum nummularium

Common Rockrose, Sun Rose, Rock Rose
5 tlin 8 cyuc 0 kcak 0 tcan 1 dwat 0.5 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis
hpa7tmwatli fyfxfre7t hjonli

drutta Helianthemum nummularium is an evergreen Shrub growing to 0.5 m (1ft 8in) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, in flower from June to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

tcanta A prostrate growing plant, it can be used as a ground cover[11].

dwatta BachThe plant is used in Bach flower remedies - the keywords for prescribing it are 'Terror', 'Panic' and 'Extreme fright'[209]. It is also one of the five ingredients in the 'Rescue remedy'[209].

nrakta Europe, including Britain, south and east to Spain and Iran in W. Asia. ksacta Basic grassland and scrub, to 600 metres[17].

propta Seed - sow spring in a greenhouse. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 6 - 8cm with a heel, late summer in a sandy soil in a frame[200].

nwatta Landscape Uses:Alpine garden, Border, Ground cover, Rock garden, Specimen. Requires an open sunny position in a light well-drained soil with a pH between 5.5 and 8[200]. Plants are hardy to at least -10°C[200]. A vigorous plant suitable for the rock garden, crevices in walls or gravel beds[200]. Plants are short-lived, though, soon becoming leggy or sparse, and require fairly frequent replacement[200]. The flowers only open in bright sunshine[200]. Plants resent root disturbance and should be placed in their permanent positions as soon as possible[200]. A polymorphic species[11], there are some named forms that have been selected for their ornamental value[200]. Plants are generally pest and disease-free[200]. Plants in this genus are notably resistant to honey fungus[200]. Special Features:Attractive foliage, Not North American native, Attracts butterflies.

6.2.544 Carex hachijoensis

Japanese sedge
5 tlin 9 cyuc 0 kcak 3 tcan 0 dwat 0.3 m hkuc
pcimhmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikliwis
hpa7tmwatli hjonli

drutta Carex hachijoensis is an evergreen Perennial growing to 0.3 m (1ft) by 0.3 m (1ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. The flowers are pollinated by Wind, Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

tcanta ContainersA good evergreen ground cover supplying winter interest. Can be used on slope or Banks. Good in containers. Variegated forms available for foliage interest including Carex hachijoensis Evergold. Can make a good edging plant. Deer resistant and shade tolerant.

nrakta Native to low alpine areas in Japan. Most sedges are found in wetlands - such as marshes, calcareous fens, bogs and other peatlands, pond and stream banks, and riparian zones. ksacta E. Asia.

propta Propagate by plant division in spring or seeding in the fall.

nwatta Best grown in moist, fertile, medium to wet soils in part shade to full shade. Soils should not be allowed to dry out. In full sun and hot sites foliage tends to bleach to an unattractive yellow. Tolerates: Deer, Heavy Shade, Erosion, Wet Soil. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in

Juglans ailanthifolia, 267
Juglans ailanthifolia cordiformis, 219
Juglans cathayensis, 266
Juglans cinerea, 70
Juglans intermedia, 257
Juglans mandschurica, 327
Juglans microcarpa, 651
Juglans nigra, 261
Juglans regia fallax, 257
Juglans regia kamaonia, 257
Juglans x bisbyi, 266
Juncus balticus, 152
Juniperus chinensis, 482
Juniperus communis, 275
Juniperus communis nana, 318
Juniperus excelsa, 624
Juniperus horizontalis, 359
Juniperus monosperma, 313
Juniperus occidentalis, 268
Juniperus osteosperma, 369
Juniperus sabina, 486
Juniperus scopulorum, 79
Juniperus squamata, 487
Juniperus virginiana, 103
Jurinea dolomiaea, 743

Kalimeris incisa, 449
Kalimeris pinnatifida, 702
Kalopanax septemlobus, 396
Kerria japonica, 441
Knautia arvensis, 737
Koeleria paniculata, 631

Laburnum alpinum, 192
Laburnum anagyroides, 191
Lamium album, 667
Lamium galeobdolon, 133
Lamium purpureum, 402
Lapsana communis, 366
Larix lyallii, 135
Lathyrus davidii, 531
Lathyrus japonicus, 34
Lathyrus japonicus maritimus, 34
Lathyrus latifolius, 531
Lathyrus odoratus, 9
Lathyrus ornatu, 35
Lathyrus palustris, 191
Lathyrus pratensis, 194
Lathyrus tuberosus, 522
Lavandula angustifolia, 659
Lavandula x intermedia, 656
Leonurus cardiaca, 118
Leonurus sibiricus, 661
Lepidium latifolium, 612
Lepidium spp., 47
Leucanthemum vulgare, 127
Leucocrocin montanum, 707
Leucojum aestivum, 461
Lewisticum officinale, 607
Leymus arenarius, 655
Leymus racemosus, 307
Ligusticum canbyi, 92
Ligusticum mutellina, 705
Ligusticum porteri, 718
Ligusticum scoticum, 311
Ligusticum sinense, 740
Ligustrum obtusifolium, 389
Ligustrum vulgare, 488
Lilium candidum, 603
Lilium concolor, 418
Lilium lancifolium, 241
Lilium martagon, 346
Lilium pardalinum, 650
Limonium carolinianum, 513
Limonium tetragonum, 714
Limonium vulgare, 515
Linaria vulgaris, 474
Liriodendron tulipifera, 423
Lithospermum erythrorhizon, 746
Lithospermum officinale, 719
Lithospermum ruderales, 460

Lobelia cardinalis, 165
Lobelia sessilifolia, 468
Lobelia siphilitica, 741
Lobelia spicata, 498
Lolium perenne, 707
Lolium temulentum, 448
Lomatium cous, 566
Lomatium macrocarpum, 558
Lonicera affinis, 686
Lonicera angustifolia, 234
Lonicera caerulea, 58
Lonicera canadensis, 148
Lonicera caprifolium, 432
Lonicera chrysantha, 140
Lonicera ciliosa, 363
Lonicera gracilipes, 700
Lonicera gracilipes glabra, 701
Lonicera henryi, 432
Lonicera involucrata, 417
Lonicera japonica, 345
Lonicera morrowii, 145
Lonicera periclymenum, 436
Lonicera sempervirens, 485
Lonicera utahensis, 449
Lonicera venulosa, 657
Lonicera villosa, 94
Lotus corniculatus, 36
Lotus uliginosus, 535
Lupinus nootkatensis, 185
Lychnis fulgens, 717
Lycium chinense, 560
Lycium pallidum, 611
Lycium ruthenicum, 602
Lycopus americanus, 476
Lycopus europaeus, 449
Lycopus uniflorus, 321
Lycopus virginicus, 342
Lysimachia barystachys, 468
Lysimachia clethroides, 149
Lysimachia nemorum, 751
Lysimachia nummularia, 470
Lysimachia vulgaris, 447
Lythrum salicaria, 115

Maackia amurensis, 189
Maclaya cordata, 492
Maclura pomifera, 427
Magnolia acuminata, 159
Magnolia hypoleuca, 625
Magnolia kobus, 428
Magnolia liliiflora, 490
Magnolia stellata, 434
Mahoberberis aquisargentii, 697
Mahonia aquifolium, 296
Mahonia bealei, 602
Mahonia japonica, 599
Mahonia napaulensis, 600
Mahonia nervosa, 616
Mahonia repens, 312
Maianthemum canadense, 158
Maianthemum dilatatum, 125
Malus angustifolia, 109
Malus baccata, 22
Malus bracteata, 635
Malus brevipes, 386
Malus coronaria, 279
Malus domestica, 42
Malus florentina, 404
Malus floribunda, 273
Malus fusca, 581
Malus glabrata, 640
Malus glaucescens, 410
Malus halliana, 388
Malus halliana spontanea, 363
Malus hupehensis, 335
Malus kansuensis, 400
Malus lancifolia, 351
Malus prattii, 628
Malus prunifolia, 52
Malus prunifolia rinki, 80
Malus pumila, 53

Fragaria nubicola, 669
 Fragaria vesca 'Semperflorens', 211
 Fragaria virginiana, 96
 Fragaria viridis, 613
 Fragaria x ananassa, 210
 Fraxinus americana, 423
 Fraxinus angustifolia, 682
 Fraxinus bungeana, 485
 Fraxinus chinensis rhynchophylla, 723
 Fraxinus excelsior, 620
 Fraxinus latifolia, 726
 Fraxinus longicuspis, 728
 Fraxinus nigra, 29
 Fraxinus ornus, 583
 Fraxinus pennsylvanica, 136
 Fritillaria meleagris, 166
 Fuchsia magellanica, 646

Gagea lutea, 720
 Galanthus nivalis, 172
 Galega officinalis, 187
 Galium aparine, 122
 Galium mollugo, 148
 Galium odoratum, 617
 Galium verum, 97
 Gastrodia elata, 664
 Gentiana andrewsii, 749
 Gentiana dahurica, 520
 Gentiana decumbens, 519
 Gentiana lutea, 442
 Gentiana macrophylla, 709
 Gentiana pannonica, 457
 Gentiana puberulenta, 747
 Gentiana punctata, 464
 Gentiana scabra, 471
 Gentiana scabra buergeri, 473
 Gentiana straminea, 510
 Geranium erianthum, 156
 Geranium incanum, 477
 Geranium macrorrhizum, 502
 Geranium maculatum, 169
 Geranium pratense, 737
 Geranium robertianum, 749
 Geranium sibiricum, 750
 Geum aleppicum, 155
 Geum canadense, 127
 Geum rivale, 99
 Geum triflorum, 4
 Geum urbanum, 619
 Ginkgo biloba, 40
 Glechoma hederacea, 132
 Gleditsia aquatica, 533
 Gleditsia japonica, 525
 Gleditsia macracantha, 534
 Gleditsia triacanthos, 265
 Glycyrrhiza uralensis, 526
 Gossypium hirsutum, 649
 Grewia biloba parviflora, 693
 Gymnocladus dioica, 33

Hablitzia tamnoides, 54
 Hebe 'Great Orme', 740
 Hebe rakaiensis, 738
 Hedera helix, 727
 Hedysarum alpinum, 186
 Hedysarum boreale, 32
 Hedysarum boreale Mackenzii, 32
 Hedysarum hedysaroides, 186
 Hedysarum occidentale, 182
 Hedysarum vicioides, 35
 Helenium autumnale, 168
 Helenium hoopesii, 458
 Helianthemum nummularium, 748
 Helianthus doronicoides, 350
 Helianthus giganteus, 291
 Helianthus hybrids, 234
 Helianthus laetiflorus, 412
 Helianthus maximilianii, 573
 Helianthus pauciflorus, 61
 Helianthus petiolaris, 360
 Helianthus strumosus, 397

Helianthus tuberosus, 236
 Heliopsis helianthoides, 113
 Helleborus niger, 176
 Helleborus viridis, 743
 Hemerocallis aurantiaca, 563
 Hemerocallis citrina, 252
 Hemerocallis dumortieri, 253
 Hemerocallis exaltata, 246
 Hemerocallis forrestii, 416
 Hemerocallis fulva, 43
 Hemerocallis fulva longituba, 246
 Hemerocallis lilioasphodelus, 253
 Hemerocallis littorea, 251
 Hemerocallis middendorffii, 197
 Hemerocallis middendorffii esculenta, 195
 Hemerocallis minor, 228
 Hemerocallis multiflora, 227
 Hemerocallis thunbergii, 246
 Hemerocallis yezeensis, 255
 Hemiptelea davidii, 105
 Heracleum sphondylium, 301
 Heracleum sphondylium montanum, 332
 Hibiscus syriacus, 560
 Hierochloa odorata, 415
 Hippophae rhamnoides, 30
 Hippophae rhamnoides turkestanica, 178
 Hippophae salicifolia, 29
 Holodiscus discolor, 438
 Holodiscus dumosus, 436
 Hordeum distichon, 245
 Hordeum jubatum, 459
 Hordeum vulgare, 240
 Hosta clausa, 460
 Hosta crispa, 374
 Hosta longipes, 322
 Hosta longissima, 413
 Hosta montana, 379
 Hosta plantaginacea, 468
 Hosta rectifolia, 469
 Hosta sieboldiana, 418
 Hosta sieboldii, 466
 Hosta undulata, 359
 Hosta ventricosa, 125
 Houttuynia cordata, 563
 Humulus japonicus, 343
 Humulus lupulus, 553
 Hyacinthoides nonscripta, 518
 Hydrangea anomala, 271
 Hydrangea arborescens, 438
 Hydrangea macrophylla, 576
 Hydrangea paniculata, 140
 Hydrangea serrata, 653
 Hydrangea serrata amagiana, 561
 Hydrangea serrata thunbergii, 607
 Hydrocotyle sibthorpioides, 719
 Hydrocotyle vulgaris, 722
 Hydrophyllum canadense, 312
 Hydrophyllum capitatum, 317
 Hydrophyllum virginianum, 325
 Hyoscyamus niger, 503
 Hypericum androsaemum, 733
 Hypericum ascyron, 150
 Hypericum bellum, 741
 Hypericum erectum, 722
 Hypericum perforatum, 128
 Hypochaeris radicata, 400

Idesia polycarpa, 428
 Ilex aquifolium, 631
 Ilex opaca, 357
 Ilex pedunculosa, 429
 Ilex verticillata, 142
 Ilex yunnanensis, 730
 Impatiens glandulifera, 604
 Impatiens noli, 602
 Indigofera tinctoria, 528
 Inula conyza, 741
 Inula helenium, 306
 Inula royleana, 749
 Inula sanguinea, 747
 Iris sibirica, 465

choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is clumping, giving the plant a 'clumping' habit. The predictable growth behaviour makes it easier to maintain without having to apply containment methods[2-1].

6.2.545 Inula royleana

5 tlin 9 cyuc 0 kcaak 0 tcan 1 dwat 0.6 m hkuc
 htut cyuti tcup hwicli hrasjlutnyikfrp hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Inula royleana is a PERENNIAL growing to 0.6 m (2ft) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from August to October, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

tcanta Disinfectant Insecticide ParasiticideUsed as a parasiticide[145]. The plant is insecticidal[240].

dwatta Disinfectant ParasiticideThe plant is disinfectant[240]. It is also considered to be poisonous[240]. The root has been used to adulterate the roots of Saussurea lappa[240]. It contains 3% of an alkaloid that produces a fall in blood pressure and stimulates tone and peristaltic movements in the intestines[240].

nrakta E. Asia - Himalayas from Pakistan to Kashmir. ksacta Scrub and grassy clearings in forests, 2100 - 4000 metres[187]. Exposed dry slopes, 3100 - 3600 metres in Kashmir[145].

propta Seed - sow spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn[111].

nwatta Succeeds in a sunny position in ordinary garden soil[1]. Requires a moist well-drained soil in sun or partial shade[187]. Grows well in heavy clay soils. This species is hardy to about -20°C[187]. Plants take some years to become fully established[233].

6.2.546 Ageratina occidentalis

Western Snakeroot

5 tlin 9 cyuc 0 kcaak 0 tcan 1 dwat 0.7 m hkuc
 hmimhtut cyuti tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Ageratina occidentalis is a PERENNIAL growing to 0.7 m (2ft 4in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

dwatta AntirheumaticThe plant is used externally in the treatment of rheumatism and swellings[254, 257].

nrakta Western N. America. ksacta Yellow Pine Forest, Red Fir Forest, Lodgepole Forest, Redwood Forest and Douglas-Fir Forest at elevations of 1900 - 3300 metres in California[276].

propta Seed - sow spring in a cold frame, only just covering the seed. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring.

nwatta Succeeds in an ordinary well-drained but moisture retentive garden soil in sun or part shade[200].

6.2.547 Geranium robertianum

Herb Robert, Robert geranium

5 tlin 9 cyuc 0 kcaak 2 tcan 2 dwat 0.4 m hkuc
 hmimhtut cyuti kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Geranium robertianum is a ANNUAL/BIENNIAL growing to 0.4 m (1ft 4in) by 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost

tender. It is in flower from June to October, and the seeds ripen from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insect. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

tcanta Dye RepellentFreshly picked leaves are rubbed on the body to repel mosquitoes[53]. They impart their own peculiar odour. A brown dye is obtained from the whole plant[168].

dwatta Antidiarrhoeal Antirheumatic Astringent Diuretic Homeopathy VulneraryHerb Robert is little used in modern herbalism, but is occasionally employed as an astringent to halt bleeding, treat diarrhoea etc in much the same way as *G. maculatum*[254]. The leaves are antirheumatic, astringent, mildly diuretic and vulnerary[7, 9, 21, 222, 238]. Modern research has shown that the leaves can lower blood sugar levels and so it can be useful in the treatment of diabetes[244]. An infusion of the leaves is used in the treatment of bleeding, stomach ailments, kidney infections, jaundice etc[222]. Externally, a wash or poultice is applied to swollen and painful breasts[222], rheumatic joints[7], bruises, bleeding etc[9]. It is best to use the entire plant, including the roots[9]. The plant can be harvested at any time from late spring to early autumn and is usually used fresh[9, 238]. A homeopathic remedy is made from the plant[9]. Details of uses are not given in this report[K].

nrakta Europe, including Britain, from Scandinavia to N. Africa, east to Japan and the Himalayas ksacta Moist shady positions in undergrowth[7], rocks and walls, hedge banks, roadsides and waste places[9].

propta Seed - sow spring in situ.

nwatta Succeeds in any moderately fertile retentive soil in a sunny position[200]. Tolerates a wide range of soil types[200], succeeding in dry soils[238]. Grows well on woodland edges[24]. The whole plant has an unpleasant aroma[244]. The foxy smell is particularly pronounced after rain[245]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233].

6.2.548 Erysimum repandum

Bushy Wallflower, Spreading wallflower

5 tlin 9 cyuc 0 kcaak 0 tcan 1 dwat 0.6 m hkuc
 htut cyuti kyuctcup hwicli hyishrasjlutnyik hpa7tli priklwis hpa7tmwatli xre7t hjonli

drutta Erysimum repandum is a ANNUAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to June. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

dwatta Antiscorbutic FebrifugeThe plant is used in Spain as an antiscorbutic[240]. The seeds are used in the treatment of fevers[240].

nrakta Central and Southern Europe. A casual in Britain. ksacta A weed of cultivated ground[200]. Railroads and roadsides, in various soils[274].

propta Seed - sow spring in situ[200]. Germination should take place within 3 weeks. The flowering season can be extended by making a succession of sowings from spring to early summer[200]. An autumn sowing should overwinter in many parts of the country and would provide flowering plants in the spring.

nwatta Requires a position in full sun in a well-drained approximately neutral soil[200]. Acid soils should be given some lime[200]. Plants are generally tolerant of poor soils[200].

6.2.549 Gentiana andrewsii

Closed Bottle Gentian, Dakota gentian

5 tlin 9 cyuc 0 kcaak 0 tcan 3 dwat 0.6 m hkuc
 hmimhtut cyuti tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta *Gentiana andrewsii* is a PERENNIAL growing to 0.6 m (2ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bumblebees, butterflies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

dwatta *Antidote Appetizer Bitter Digestive Ophthalmic Poulitce Stomachic Tonic*The root is said to be an antidote to snakebites[61, 254]. An infusion of the roots has been used as a wash and also taken internally in the treatment of pain and headaches[257]. An infusion of the roots has been used as drops for sore eyes[257]. This N. American species has medicinal properties practically identical with the European gentians[4]. The following notes are based on the general uses of *G. lutea* which is the most commonly used species in the West[K]. *Gentiana* root has a long history of use as a herbal bitter in the treatment of digestive disorders and is an ingredient of many proprietary medicines. It contains some of the most bitter compounds known and is used as a scientific basis for measuring bitterness[238]. It is especially useful in states of exhaustion from chronic disease and in all cases of debility, weakness of the digestive system and lack of appetite[4]. It is one of the best strengtheners of the human system, stimulating the liver, gall bladder and digestive system[238], and is an excellent tonic to combine with a purgative in order to prevent its debilitating effects[4]. The root is anthelmintic, anti-inflammatory, antiseptic, bitter tonic, cholagogue, emmenagogue, febrifuge, refrigerant, stomachic[4, 7, 9, 14, 21, 165, 238]. It is taken internally in the treatment of liver complaints, indigestion, gastric infections and anorexia[238]. It should not be prescribed for patients with gastric or duodenal ulcers[238]. The root is harvested in the autumn and dried for later use[4]. It is quite likely that the roots of plants that have not flowered are the richest in medicinal properties[4].

nrakta Eastern N. America - Quebec to Manitoba, Georgia and Nebraska. ksacta Meadows, damp prairies and low thickets[43].

propta Seed - best sown in early January in a light position in a cold frame[239]. It can also be sown in late winter or early spring but the seed germinates best if given a period of cold stratification and quickly loses viability when stored, with older seed germinating slowly and erratically[200, 239]. It is advantageous to keep the seed at about 10°C for a few days after sowing, to enable the seed to imbibe moisture[239]. Following this with a period of at least 5 - 6 weeks with temperatures falling to between 0 and -5°C will usually produce reasonable germination[239]. It is best to use clay pots, since plastic ones do not drain so freely and the moister conditions encourage the growth of moss, which will prevent germination of the seed[239]. The seed should be surface-sown, or only covered with a very light dressing of compost. The seed requires dark for germination, so the pots should be covered with something like newspaper or be kept in the dark[239]. Pot up the seedlings into individual pots as soon as they are large enough to handle and grow on in light shade in the greenhouse for at least their first winter. The seedlings grow on very slowly, taking 2 - 7 years to reach flowering size[239]. When the plants are of sufficient size, place them out into their permanent positions in late spring or early summer. Division in March[111]. Most members of this genus have either a single tap-root, or a compact root system united in a single root head, and are thus unsuitable for division[239]. Cuttings of basal shoots in late spring[238].

nwatta In general, gentians require a moist well-drained soil in a sheltered position, a certain minimum of atmospheric humidity, high light intensity but a site where temperatures are not too high[239]. They are therefore more difficult to grow in areas with hot summers and in such a region they appreciate some protection from the strongest sunlight[200, 239]. Most species will grow well in the rock garden[200]. This species is fairly easy to grow, succeeding in most humus-rich soils[239]. It tolerates more shade (but not full shade) than most members of the genus, growing well in a woodland garden[200, 239]. Plants are intolerant of root disturbance[200]. A moisture loving plant, preferring to grow with full exposure to the sun but with plenty of underground moisture in the summer, it grows better in the north and west of Britain[1].

6.2.550 *Pinellia tripartita*

5 tlin 9 cyuc 0 kcaak 0 tcan 1 dwat 0.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprklwis hpa7tmwatli xre7t hjonli

drutta *Pinellia tripartita* is a CORM growing to 0.5 m (1ft 8in) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although we have no record of toxicity for this species, all parts of the plant probably contain calcium oxalate. This is toxic and if consumed makes the mouth and digestive tract feel as though hundreds of needles are being stuck into it[K]. However, calcium oxalate is easily destroyed by thoroughly cooking or drying the plant[172].

dwatta *Antiemetic Antitussive Cardiotoxic Diuretic Expectoant*The root is antiemetic, antitussive, cardiotoxic, diuretic, expectoant[218].

nrakta E. Asia - S. Japan. ksacta Not known propta Seed - we have no information but suggest sowing the seed in a cold frame as soon as it is ripe if this is possible otherwise in early spring. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division as new growth begins in spring. Bulbils from the leaf axils.

nwatta Easily grown in a rich soil, it requires plenty of water in the growing season[1]. Succeeds in full sun or partial shade[188]. Plants can be naturalized in woodland[1]. Plants produce bulbils in their leaf axils[188].

6.2.551 *Geranium sibiricum*

Siberian geranium

5 tlin 9 cyuc 0 kcaak 0 tcan 1 dwat 0.2 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprklwis hpa7tmwatli xre7t hjonli

drutta *Geranium sibiricum* is a PERENNIAL growing to 0.2 m (0ft 8in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

dwatta *Astringent Diuretic Vulnerary*The plant is used as an astringent, diuretic and vulnerary[240].

nrakta Eastern and Central Europe. ksacta Not known propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Succeeds in any moderately fertile retentive soil in a sunny position[200]. Tolerates a wide range of soil types[200]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233].

6.2.552 *Filipendula vestita*

5 tlin 9 cyuc 0 kcaak 0 tcan 1 dwat 0.8 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyikfrip hpa7tli prklwis hpa7tmwatli fyfxre7t hjonli

drutta *Filipendula vestita* is a PERENNIAL growing to 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to August, and the seeds ripen from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

Crataegus jackii, 385
Crataegus jonesiae, 361
Crataegus laciniata, 552
Crataegus laevigata, 283
Crataegus maximowiczii, 383
Crataegus missouriensis, 197
Crataegus mollis, 229
Crataegus monogyna, 323
Crataegus nigra, 636
Crataegus opaca, 277
Crataegus pedicellata, 201
Crataegus pedicellata gloriosa, 279
Crataegus pennsylvanica, 537
Crataegus pentagona, 586
Crataegus phaenopyrum, 420
Crataegus pinnatifida, 585
Crataegus pinnatifida major, 557
Crataegus pruinosa, 280
Crataegus punctata, 274
Crataegus rivularis, 419
Crataegus rotundifolia, 282
Crataegus sanguinea, 360
Crataegus schraderana, 539
Crataegus submolis, 224
Crataegus succulenta, 225
Crataegus uniflora, 416
Crataegus x grignonensis, 287
Cryptomeria japonica, 725
Cryptotaenia canadensis, 308
Cryptotaenia japonica, 239
Cucurbita argyrosperma, 13
Cucurbita moschata, 11
Cucurbita pepo, 14
Cuscuta japonica, 711
Cydonia oblonga, 552
Cymbalaria muralis, 117
Cynara cardunculus, 600
Cynara scolymus, 609
Cypripedium calceolus parviflorum, 512
Cypripedium calceolus pubescens, 516
Cystopteris bulbifera, 463
Cystopteris montana, 449
Cytisus scoparius, 530

Dactylis glomerata, 497
Daphne mezereum, 500
Daphniphyllum macropodum, 709
Daucus carota, 354
Daucus carota sativus, 208
Daucus pusillus, 349
Decaisnea fargesii, 288
Delphinium cashmerianum, 514
Delphinium elatum, 506
Delphinium menziesii, 169
Delphinium nudicaule, 174
Delphinium nuttallianum, 509
Delphinium semibarbatum, 748
Dendranthema indicum, 674
Dendranthema lavandulifolium, 661
Dendranthema x grandiflorum, 660
Desmanthus illinoensis, 179
Desmodium canadense, 39
Desmodium elegans, 533
Deutzia scabra, 694
Dianthus barbatus, 478
Dianthus chinensis, 742
Dianthus plumarius, 469
Dianthus superbus, 348
Diervilla lonicera, 165
Digitalis ferruginea, 500
Digitalis grandiflora, 171
Digitalis purpurea, 504
Dioscorea batatas, 205
Dioscorea villosa, 644
Diospyros virginiana, 199
Diplotaxis tenuifolia, 564
Dipsacus fullonum, 507
Dipsacus sativus, 502
Dirca palustris, 508
Disporum sessile, 474
Disporum trachycarpum, 411

Dodecatheon hendersonii, 722
Dryas octopetala, 35
Duchesnea indica, 678

Echinacea angustifolia, 162
Echinacea pallida, 504
Echinochloa crus, 608
Echinops latifolius, 172
Echinops ritro, 177
Elaeagnus angustifolia, 6
Elaeagnus commutata, 7
Elaeagnus multiflora, 523
Elaeagnus multiflora ovata, 522
Elaeagnus orientalis, 182
Elaeagnus parvifolia, 31
Elaeagnus umbellata, 32
Elaeagnus x ebbingei, 521
Eleutherococcus divaricatus, 644
Eleutherococcus gracilistylus, 695
Eleutherococcus senticosus, 110
Eleutherococcus sessiliflorus, 340
Eleutherococcus sieboldianus, 288
Eleutherococcus spinosus, 397
Elsholtzia ciliata, 375
Elsholtzia fruticosa, 447
Elymus canadensis, 127
Elymus glauca, 366
Epilobium angustifolium, 87
Epilobium latifolium, 311
Epimedium sagittatum, 666
Equisetum arvense, 131
Equisetum hyemata, 112
Equisetum pratense, 407
Equisetum scirpoides, 4
Equisetum telmateia, 695
Erygon annuus, 147
Eryngium planum, 746
Erysimum capitatum, 745
Erysimum cheiranthoides, 101
Erysimum repandum, 749
Eucommia ulmoides, 428
Euonymus alatus, 440
Euonymus alatus alpinus, 141
Euonymus americanus, 731
Euonymus atropurpureus, 440
Euonymus europaeus, 138
Euonymus fortunei, 731
Euonymus hamiltonianus, 430
Euonymus hamiltonianus maackii, 454
Euonymus hamiltonianus sieboldianus, 432
Euonymus macropterus, 444
Euonymus oxyphyllus, 441
Euonymus sachalinensis, 692
Eupatorium cannabinum, 506
Eupatorium capillifolium, 161
Eupatorium hyssopifolium, 157
Eupatorium maculatum, 164
Eupatorium purpureum, 142
Euphorbia esula, 167
Euphorbia lathyris, 708
Euphrasia officinalis, 712
Euptelea pleiosperma, 686

Fagopyrum spp., 562
Fagus sylvatica, 215
Ferula gummosa, 657
Festuca pratensis, 453
Filipendula kamschatica, 112
Filipendula multijuga, 708
Filipendula rubra, 162
Filipendula ulmaria, 93
Filipendula vestita, 750
Filipendula vulgaris, 126
Foeniculum vulgare, 644
Forestiera neomexicana, 646
Forsythia suspensa, 687
Forsythia viridissima, 732
Forsythia x intermedia, 731
Fragaria, 328
Fragaria chiloensis, 324
Fragaria moschata, 577

Carex morrowii , 739
 Carex riparia , 699
 Carex sylvatica , 173
 Carlina acanthifolia , 460
 Carlina acaulis , 393
 Carlina vulgaris , 720
 Carpinus betulus , 724
 Carpinus caroliniana , 137
 Carum carvi , 66
 Carya aquatica , 682
 Carya buckleyi , 629
 Carya cathayensis , 572
 Carya cordiformis , 262
 Carya glabra , 259
 Carya glabra megacarpa , 315
 Carya hybrids , 213
 Carya illinoensis , 545
 Carya laciniata , 568
 Carya ovalis , 569
 Carya ovata , 260
 Carya pallida , 570
 Carya texana , 627
 Carya tomentosa , 260
 Carya x laneyi , 265
 Catalpa bignonioides , 726
 Catalpa bungei , 728
 Catalpa ovata , 685
 Ceanothus species , 533
 Cedrus atlantica , 724
 Cedrus libani , 681
 Celastrus angulatus , 484
 Celastrus flagellaris , 432
 Celtis laevigata , 625
 Centaurea iberica , 718
 Centaurea jacea , 718
 Centaurea montana , 169
 Centaurea nigra , 466
 Centaurea scabiosa , 508
 Centaurea solstitialis , 715
 Centranthus ruber , 669
 Cerastium fontanum , 678
 Chaenomeles cathayensis , 233
 Chaenomeles japonica , 611
 Chaenomeles speciosa , 294
 Chaenomeles x californica , 300
 Chaenomeles x superba , 609
 Chaerophyllum bulbosum , 609
 Chamaecrista fasciculata , 504
 Chamaecyparis lawsoniana , 724
 Chamaecyparis nootkatensis , 482
 Chamaecyparis obtusa , 479
 Chamaecyparis pisifera , 479
 Chamaecyparis thyoides , 483
 Chamaemelum nobile , 404
 Chelidonium majus , 704
 Chelone glabra , 166
 Chenopodium bonus , 248
 Chenopodium capitatum , 318
 Chenopodium ficifolium , 360
 Chenopodium foliosum , 320
 Chenopodium giganteum , 295
 Chenopodium spp. , 206
 Chenopodium vulvaria , 367
 Chimonobambusa marmorea , 700
 Chimonobambusa quadrangularis , 643
 Chionanthus virginicus , 433
 Chondrilla ambigua , 509
 Chrysosplenium alternifolium , 400
 Chrysosplenium americanum , 155
 Chrysosplenium oppositifolium , 368
 Cichorium intybus , 59
 Cimicifuga dahurica , 453
 Cimicifuga foetida , 146
 Cimicifuga heracleifolia , 164
 Cimicifuga racemosa (Actaea racemosa) , 448
 Cimicifuga simplex , 444
 Cirsium acaulon , 519
 Cirsium arvense , 381
 Cirsium eriophorum , 659
 Cirsium foliosum , 618
 Cirsium japonicum , 668
 Cirsium palustre , 392

Claytonia sibirica , 68
 Clematis brachyura , 704
 Clematis chinensis , 689
 Clematis columbiana , 488
 Clematis connata , 728
 Clematis douglasii , 742
 Clematis flammula , 691
 Clematis ianthina , 436
 Clematis ligusticifolia , 485
 Clematis orientalis , 729
 Clematis patens , 690
 Clematis pierotii , 694
 Clematis recta , 149
 Clematis serratifolia , 692
 Clematis terniflora , 688
 Clematis tibetana , 730
 Clematis vitalba , 427
 Cochlearia danica , 716
 Colutea arborescens , 192
 Colutea x media , 534
 Conium maculatum , 451
 Convallaria keiskei , 153
 Convallaria majalis , 25
 Cornus alternifolia , 159
 Cornus amomum , 439
 Cornus controversa , 626
 Cornus kousa , 536
 Cornus kousa chinensis , 535
 Cornus macrophylla , 653
 Cornus mas , 230
 Cornus occidentalis , 686
 Cornus officinalis , 548
 Cornus quinquevallis , 403
 Cornus rugosa , 488
 Cornus sanguinea , 421
 Cornus sericea , 23
 Coronilla varia , 195
 Corylus americana , 289
 Corylus avellana , 201
 Corylus chinensis , 621
 Corylus columnata , 264
 Corylus cornuta , 290
 Corylus cornuta californica , 278
 Corylus heterophylla , 279
 Corylus hybrids , 198
 Corylus maxima , 196
 Corylus sieboldiana , 588
 Corylus sieboldiana manschurica , 574
 Corylus x vilmorinii , 337
 Cotinus coccinifera , 688
 Cotoneaster bacillaris , 729
 Cotoneaster divaricatus , 492
 Cotoneaster franchetii , 692
 Cotoneaster racemifolius , 401
 Cotoneaster racemiflorus , 111
 Cotoneaster simonsii , 489
 Crambe cordifolia , 597
 Crambe maritima , 231
 Crambe tatarica , 300
 Crataegomespilus dardarii , 589
 Crataegus acclivis , 224
 Crataegus altaica , 280
 Crataegus anomala , 285
 Crataegus aprica , 586
 Crataegus arnoldiana , 537
 Crataegus azarolus , 549
 Crataegus canbyi , 372
 Crataegus champlainensis , 554
 Crataegus chrysoarpa , 281
 Crataegus coccinoides , 282
 Crataegus columbiana , 284
 Crataegus crus , 368
 Crataegus cuneata , 578
 Crataegus douglasii , 223
 Crataegus durobrivensis , 232
 Crataegus ellwangeriana , 539
 Crataegus flabellata , 284
 Crataegus flava , 584
 Crataegus heterophylla , 635
 Crataegus holmesiana , 221
 Crataegus hupehensis , 588
 Crataegus intricata , 289

dwatta MiscellanyOne report says that the plant has medicinal properties but gives no details[145].

nrakta E. Asia - Himalayas from Afghanistan to Nepal and western China. ksacta Along mountain drains and in taller herbaceous vegetation, 2200 - 2900 metres[145]. Alpine meadows and riverbanks at elevations of 3000 - 3200 metres in Yunnan Povince, China[266].

propta Seed - best sown in the autumn in a cold frame[1]. The seed can also be sown in a cold frame in spring, germinating best at a temperature of 10 - 13°C[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer if they have grown enough. If not, keep them in a cold frame for the winter and plant them out in late spring. Division in autumn or winter[200]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Requires a humus-rich moist soil in semi-shade[200]. Succeeds in full sun only if the soil is reliably moist throughout the growing season[200]. Dislikes dry or acid soils. Does well in marshy soils. Grows well in heavy clay soils. Members of this genus are rarely if ever troubled by browsing deer[233].

6.2.553 Pinellia pedatisecta

Hu Zhang

5 tin 9 cyuc 0 kcak 0 tcan 2 dwat 0.2 m hkuc
 hmimhtut cyuti tcup hwicli hrasjlutnyik hpa7tli flatprikliw hpa7tmwathi xre7t hjonli

drutta Pinellia pedatisecta is a CORM growing to 0.2 m (0ft 8in) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although we have no record of toxicity for this species, all parts of the plant probably contain calcium oxalate. This is toxic and if consumed makes the mouth and digestive tract feel as though hundreds of needles are being stuck into it[K]. However, calcium oxalate is easily destroyed by thoroughly cooking or drying the plant[172].

dwatta Antiemetic Antiphlogistic Cancer Expectorant Febriifuge Sialagogue Styptic UrinaryThe poisonous tubers are used as a medicine for the treatment of enlargement of the lymph node and urinary tract infections[266]. The following notes for P. ternata almost certainly also apply to this species[218]. The root is antiemetic, antiphlogistic, expectorant, febrifuge, sialagogue, styptic. Strengthens the spleen[147, 174, 176, 178]. Modern research has shown that this remedy is very effective in controlling nausea and vomiting[238]. It is also an ingredient of a Chinese prescription for removing gallstones without surgery, a process that usually causes severe nausea[238]. The root is also used internally in the treatment of coughs with thin watery phlegm and gastritis[238]. The fresh root is extremely acrid and contains toxins, these are neutralized upon drying or by soaking in tea or vinegar[238]. The root is harvested in the summer and dried for later use, it should not be used fresh[174, 238]. Extracts of the plant have been shown to have analgesic, antiemetic, anticancer and sedative activity[218].

nrakta E. Asia - N. and W. China ksacta Forests, in valleys or shady places below elevations of 1000 metres[266].

propta Seed - we have no information but suggest sowing the seed in a cold frame as soon as it is ripe if this is possible otherwise in early spring. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring

7 Alphabetical Index

or early summer, after the last expected frosts. Division as new growth begins in spring. Bulbils from the leaf axils.

nwatta Easily grown in a rich soil, it requires plenty of water in the growing season[1]. Succeeds in full sun or partial shade[188]. Plants can be naturalized in woodland[1]. Plants produce bulbils in their leaf axils[188].

6.2.554 Ajuga australis

Australian Bugle

5 tin 9 cyuc 0 kcak 3 tcan 1 dwat 0.2 m hkuc
 htut cyuti kyuctcup hwicli hrasjlutnyik hpa7tli flatprikliw hpa7tmwathi xre7t hjonli

drutta Ajuga australis is an evergreen Perennial growing to 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

tcanta Plants can be used for ground cover[200]. dwatta SalveThe leaves are used as a salve for wounds[238] and also in the treatment of boils and sores[152, 238].

nrakta E. Australia - New South Wales, Tasmania and Victoria. ksacta Most habitats, especially in open forests, in sandy soils in the montane zone[152, 154].

propta Seed - sow spring or autumn in the open border[1]. Division in spring.

nwatta Prefers a humus-rich, moisture retentive soil and a sunny position[200]. Easily grown in the rock garden[1], it spreads rapidly by root suckers[157].

6.2.555 Lysimachia nemorum

Yellow Pimpernel

5 tin 9 cyuc 0 kcak 0 tcan 1 dwat 0.5 m hkuc
 hmimhtut cyuti tucphja7n hwicli hrasjlutnyikfrip hpa7tli flatprikliw hpa7tmwathi fyifxre7t hjonli

drutta Lysimachia nemorum is an evergreen Perennial growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

dwatta AstringentAn astringent herb, yellow pimpernel is used as a wound herb to staunch bleeding[254].

nrakta Western and central Europe, including Britain, from Norway to Spain, east to the Carpathians. ksacta Woods and shady hedgebanks[17].

propta Seed - sow spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn[200]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring. Basal cuttings, March to April in a cold frame. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta An easily grown plant, succeeding in a moist or wet loamy soil in sun or partial shade[200]. Hardy to at least -25°C[187]. Most species in this genus seem to be immune to the predations of rabbits[233].

Alphabetical Index

Abelmoschus esculentus , 561
Abies balsamea , 76
Acaenia anserinifolia , 720
Acer acuminatum , 687
Acer argutum , 403
Acer caesium , 728
Acer campestre , 378
Acer carpinifolium , 365
Acer ginnala , 137
Acer glabrum , 108
Acer macrophyllum , 575
Acer mono , 118
Acer negundo , 73
Acer platanoides , 101
Acer pseudoplatanus , 355
Acer saccharinum , 68
Acer saccharum , 213
Acer saccharum grandidentatum , 547
Acer saccharum nigrum , 216
Acer tataricum , 107
Acer truncatum , 138
Achillea erba , 739
Achillea millefolium , 329
Achillea ptarmica , 128
Achillea sibirica , 723
Acinos alpinus , 458
Acinos rotundifolius , 473
Aconitum carmichaelii , 168
Aconitum chinense , 740
Aconitum ferox , 736
Aconitum hemsleyanum , 498
Aconitum heterophyllum , 707
Aconitum japonicum , 496
Aconitum kusnezoffii , 735
Aconitum lycocotum , 148
Aconitum lycocotum vulparia , 149
Aconitum multifidum , 702
Aconitum napellus , 150
Aconitum orientale , 736
Aconitum uncinatum , 734
Aconitum violaceum , 710
Actaea pachypoda , 171
Actaea rubra , 176
Actaea spicata , 515
Actinidia arguta , 199
Actinidia coriacea , 584
Actinidia kolomikta , 52
Actinidia lanceolata , 571
Actinidia melanandra , 559
Actinidia polygama , 230
Actinidia purpurea , 549
Adiantum pedatum , 511
Adonis aestivalis , 742
Adonis amurensis , 172
Adonis vernalis , 174
Aegopodium podagraria , 317
Aesculus chinensis , 570
Aesculus flava , 218
Aesculus glabra , 376
Aesculus hippocastanum , 258
Aesculus parviflora , 343
Aesculus pavia , 638
Aesculus spp , 215
Aesculus turbinata , 623
Aesculus x carnea , 621
Ageratina altissima , 732
Ageratina aromatica , 452
Ageratina herbacea , 732
Ageratina occidentalis , 749
Ajuga australis , 751
Ajuga chamaepitys , 743
Ajuga reptans , 131
Akebia quinata , 221
Akebia trifoliata , 551
Akebia x pentaphylla , 224
Alcea rosea , 601
Alchemilla mollis , 163

Allium ampeloprasum , 542
Allium angulosum , 310
Allium cernuum , 543
Allium fistulosum , 544
Allium flavum , 421
Allium porrum , 565
Allium schoenoprasum , 544
Allium schoenoprasum sibiricum , 212
Allium suaveolens , 317
Allium tuberosum , 211
Alnus cordata , 532
Alnus glutinosa , 36
Alnus hirsuta , 37
Alnus incana , 10
Alnus japonica , 191
Alnus maritima , 38
Alnus maximowiczii , 193
Alnus rugosa , 10
Alnus serrulata , 38
Alnus sinuata , 9
Alnus tenuifolia , 529
Alnus viridis crispa , 190
Althaea officinalis , 44
Amaranthus blitum , 245
Amaranthus caudatus , 237
Amaranthus cruentus , 56
Amaranthus hypochondriacus , 61
Amaranthus retroflexus , 95
Amaranthus spinosus , 411
Amaranthus tricolor , 93
Ambrosia artemesifolia , 376
Ambrosia trifida , 5
Amelanchier alnifolia , 203
Amelanchier asiatica , 277
Amelanchier humilis , 300
Amelanchier huroensis , 586
Amelanchier interior , 582
Amelanchier obovalis , 607
Amelanchier ovalis , 640
Amelanchier parviflora , 336
Amelanchier sanguinea , 291
Amelanchier weigandii , 589
Amelastorbus jackii , 110
Amianthium muscitoxicum , 503
Ampelopsis brevipedunculata , 623
Amphicarpaea bracteata , 178
Anacamptis pyramidalis , 674
Anchusa azurea , 115
Anchusa officinalis , 353
Anemone canadensis , 170
Anemone cylindrica , 514
Anemone flaccida , 715
Anemone narcissiflora , 154
Anemone nemorosa , 516
Anemone nikoensis , 711
Anemone obtusiloba , 510
Anemone virginiana , 519
Angelica archangelica , 306
Angelica atropurpurea , 341
Angelica gigas , 407
Angelica sylvestris , 299
Anthemis arvensis , 519
Anthemis cotula , 478
Anthemis tinctoria , 511
Antirrhinum majus , 705
Apium graveolens , 617
Apium graveolens rapaceum , 566
Aplectrum hyemale , 512
Apocynum androsaemifolium , 520
Apocynum cannabinum , 351
Apocynum pictum , 492
Apocynum venetum , 514
Arabis caucasica , 394
Arabis hirsuta , 476
Arabis lyrata , 468
Aralia chinensis , 398
Aralia cordata , 244

Aralia hispida , 121
Aralia mandshurica , 399
Aralia nudicaulis , 247
Aralia racemosa , 299
Aralia schmidtii , 358
Aralia spinosa , 632
Arctium lappa , 57
Arctium minus , 316
Aristolochia clematidis , 746
Aristolochia macrophylla , 735
Armoracia rusticana , 332
Arnica angustifolia alpina , 176
Arnica montana , 738
Aronia arbutifolia , 413
Aronia melanocarpa , 84
Aronia prunifolia , 377
Artemisia abrotanum , 446
Artemisia glacialis , 465
Artemisia gmelinii , 146
Artemisia lactiflora , 500
Artemisia sacrorum , 147
Artemisia scoparia , 157
Artemisia vestita , 164
Artemisia vulgaris , 120
Arum italicum , 677
Arum maculatum , 654
Aruncus dioicus , 111
Arundinaria gigantea , 582
Arundinaria spp , 272
Asarum canadense , 98
Asarum europaeum , 515
Asarum reflexum , 668
Asclepias incarnata , 90
Asparagus officinalis , 13
Asparagus verticillatus , 642
Asperula cynanchica , 519
Asplenium scolopendrium , 513
Aster amellus , 417
Aster cordifolius , 114
Aster lanceolatus , 493
Aster macrophyllus , 122
Aster novae , 497
Aster novi , 505
Aster puniceus , 166
Aster tataricus , 142
Aster tripolium , 672
Aster yomema , 702
Astilbe chinensis , 463
Astilbe thunbergii , 460
Astrantia major , 505
Astrebla squarrosa , 243
Athyrium filix , 153
Athyrium niponicum , 157
Attractylodes macrocephala , 736
Avena barbata , 416

Baccharis halimifolia , 490
Barbarea verna , 616
Barbarea vulgaris , 614
Bellis perennis , 351
Berberis aggregata , 604
Berberis amurensis , 643
Berberis angulosa , 604
Berberis aristata , 558
Berberis buxifolia , 238
Berberis canadensis , 309
Berberis chinensis , 711
Berberis concinna , 399
Berberis cooperi , 301
Berberis everstiana , 340
Berberis fendleri , 656
Berberis gagnepainii , 342
Berberis georgii , 86
Berberis koreana , 151
Berberis lycium , 596
Berberis parisepala , 644
Berberis rubrostilla , 610
Berberis sherriffii , 698
Berberis sieboldii , 454
Berberis sikkimensis , 658
Berberis soulieana , 703

Berberis ulcina , 677
Berberis verruculosa , 408
Berberis vulgaris , 84
Berberis wallichiana , 645
Berberis x carminea , 598
Berberis x lologensis , 598
Berberis x stenophylla , 295
Berchemia flavescens , 407
Bergenia crassifolia , 126
Bergenia purpurascens , 517
Berula erecta , 146
Beta vulgaris altissima , 243
Beta vulgaris cicla , 251
Beta vulgaris craca , 254
Beta vulgaris flavescens , 250
Beta vulgaris maritima , 408
Betula alleghaniensis , 77
Betula ermanii , 158
Betula lenta , 72
Betula nigra , 75
Betula pendula , 17
Betula platyphylla , 103
Betula populifolia , 106
Betula pubescens , 18
Betula schmidtii , 480
Betula utilis , 725
Bidens tripartita , 675
Brassica oleracea botrytis , 65
Brassica oleracea gongyloides , 318
Brassica oleracea italica , 12
Bromus carinatus , 459
Bromus inermis , 170
Bromus ramosus , 507
Bromus thominii , 156
Bryonia alba , 691
Bryonia dioica , 694
Buddleia davidii , 487
Bumelia lanuginosa , 626
Bunium bulbocastanum , 247
Bupleurum chinense , 123
Bupleurum falcatum , 121

Calendula arvensis , 665
Calendula officinalis , 21
Callicarpa japonica , 697
Calocedrus decurrens , 683
Calycanthus floridus glaucus , 643
Calystegia hederacea , 415
Calystegia pubescens , 439
Calystegia sepium , 392
Calystegia soldanella , 722
Calystegia subvolubilis , 439
Camassia leichtlinii , 62
Camassia quamash , 49
Campanula latifolia , 89
Campsis radicans , 483
Caragana gerardiana , 194
Cardamine amara , 321
Cardamine bulbifera , 382
Cardamine bulbosa , 406
Cardamine fauriei , 407
Cardamine flexuosa , 355
Cardamine hirsuta , 334
Cardamine impatiens , 369
Cardamine kitaibelii , 673
Cardamine leucantha , 418
Cardamine macrophylla , 652
Cardamine pennsylvanica , 335
Cardamine pratensis , 328
Cardamine prorepens , 374
Cardamine raphanifolia , 469
Cardamine rotundifolia , 670
Cardamine schinziana , 366
Cardamine scutata , 402
Cardaria draba , 662
Carex aquatilis , 151
Carex disticha , 469
Carex eburnea , 29
Carex elata , 664
Carex hachijoensis , 748
Carex hirta , 718